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ABSTRACT

This document contains seven learning activity packets (LAPs) that outline the study activities for the orientation and safety instructional area for an Auto Mechanics I course. The seven LAPs cover the following topics: orientation, safety, hand tools, arc welding, oxyacetylene cutting, oxyacetylene fusion welding, and oxyacetylene braze welding. Each LAP contains a cover sheet that describes its purpose, an introduction, and the tasks included in the LAP; learning steps (checklist); pretest; and various assignment sheets. Materials are illustrated with line drawings. The LAPs are referenced to a curriculum guide for the Auto Mechanics I course. (KC)

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Learning Activity Packets (LAPs)

Auto Mechanics I

Section A — Orientation and Safety

LAP #1 — Orientation
LAP #2 — Safety
LAP #3 — Hand Tools
LAP #4 — Arc Welding
LAP #5 — Oxyacetylene Cutting
LAP #6 — Oxyacetylene Fusion Welding
LAP #7 — Oxyacetylene Braze Welding

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State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO._____ CODE:_____

MAJOR INSTRUCTIONAL AREA

ORIENTATION AND SAFETY

INSTRUCTIONAL UNIT

ORIENTATION
SECTION A--UNIT I

LEARNING ACTIVITY PACKET NO.

1

PREREQUISITE LAP(S)

None

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities for "Orientation." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training.

INTRODUCTION: The course of study in this LAP will help the student become able to list facts concerning the occupational outlook of auto mechanics and steps involved in automotive shopwork. These studies will also aid the student in becoming able to describe the VICA organization and complete a personal information sheet.

TASKS INCLUDED IN THIS LAP:

None

AUTO MECHANICS I
ORIENTATION
SECTION A--UNIT I

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps.

_____1. Read Unit and Specific Objectives, page 1-A.

_____2. Study The Information Sheet, pages 5-A through 7-A.

_____3. Watch Film, "Occupation: Auto Mechanic."

_____4. Do LAP Assignment Sheet #1, LAP page 3.

_____5. Do LAP Assignment Sheet #2, LAP page 5.

_____6. Watch Film, "Know Your Car."

_____7. Do LAP Assignment Sheet #3, LAP page 7.

_____8. Do LAP Assignment Sheet #4, LAP page 9.

_____9. Watch Film, "VICA Going Places."

_____10. Do LAP Assignment Sheet #5, LAP page 11.

_____11. Do LAP Assignment Sheet #6, LAP page 15.

_____12. Do Assignment Sheet #1--Personal Information Sheet, page 9-A.

_____13. Review Information and Assignment Sheets.

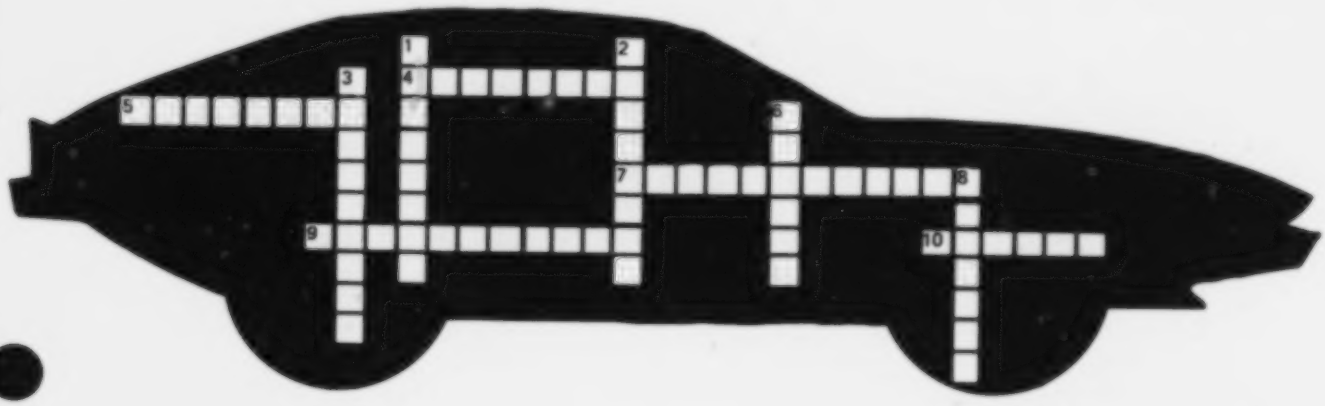
_____14. Take Orientation Unit I Test (see your instructor). If you score 85 percent or above, continue to the next Learning Activity Packet. Otherwise, ask your instructor about additional study requirements and possible re-testing.

ORIENTATION AND SAFETY
UNIT I

LAP ASSIGNMENT SHEET #1--AUTO MECHANICS

NAME_____ SCORE_____

1. List facts concerning the occupational outlook of auto mechanics by completing the following crossword puzzle with the words missing from the statements below.



a. Job (7 Across) result each year from the need to replace experienced mechanics who are (2 Down), (6 Down), or (4 Across) to related fields of work.

b. The amount of vehicles (3 Down) each year requiring more mechanics to (8 Down) them.

c. Added features such as air conditioning, power (1 Down), power (10 Across), and exhaust (5 Across) devices increase (9 Across).

2. List places that employ auto mechanics by unscrambling the letters in the list below. Write the answer in the space provided.

(NOTE: There may be more than one word in each group of unscrambled letters.)

Example: C R E V I S E

S E R V I C E stations

a. R E N P I D E P A N N D I R T E E

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ shops

b. R E V I C E S

_ _ _ _ _ _ _ _ _ departments

c. L E E R D R A C A

_ _ _ _ _ _ _ _ _ _ agencies

d. B E L L I E S A G U O M A T I O N

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ companies.

e. D A L L A D E N T A F L E E T O C A R S

_ _ _ _ _ _ _ _ _, _ _ _ _ _ _ _ _, _ _ _ _
_ _ _ _ _ _ government vehicle maintenance departments.

3. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, proceed to LAP Step 6. Otherwise, continue to LAP Step 5.

ORIENTATION AND SAFETY
UNIT I

LAP ASSIGNMENT SHEET #2--AUTO MECHANICS

1. List three facts concerning the occupational outlook of auto mechanics.

   a.

   b.

   c.

2. List six places that employ auto mechanics.

   a.

   b.

   c.

   d.

   e.

   f.

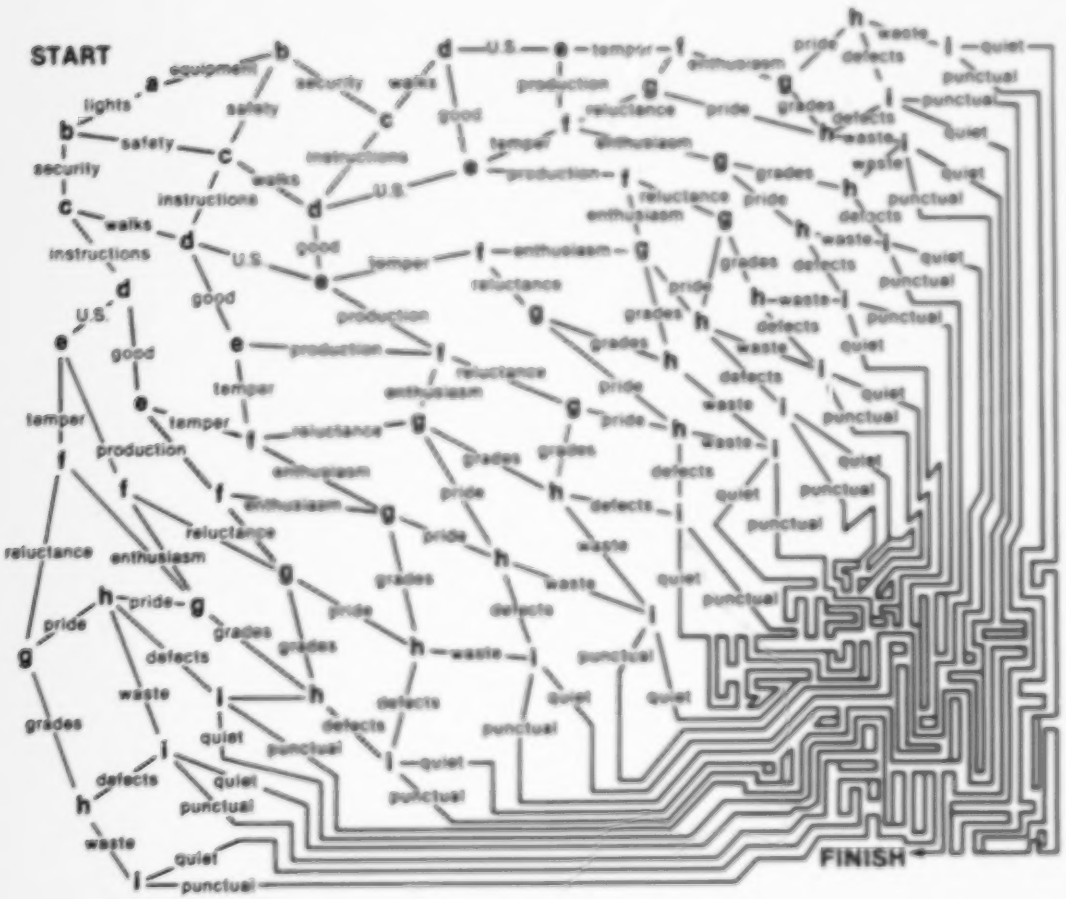
3. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 6. If additional study is required, discuss a program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 6.

ORIENTATION AND SAFETY
UNIT I

LAP ASSIGNMENT SHEET #3--AUTOMOTIVE SHOPWORK

NAME_____ SCORE_____

1. List student requirements for the auto mechanics program by working your way through the following maze. Below the maze is a set of statements, each of which gives you a choice of two words to complete the statement. Follow your choices through the maze. If all of your choices are correct you will reach the finish.



Student requirements for the auto mechanics program.

a. Operate the shop (lights/equipment) correctly.

b. Be (safely/security) conscious; follow (safety/security) regulations.

c. Take (instructions/walks) readily; follow directions.

d. Be a (good/U.S.) citizen.

e. Control (production/temper).

f. Have (enthusiasm/reluctance) about work.

g. Have (grades/pride) in the trade.

h. Be conscious of (waste/defects) in materials and man-hours.

i. Be (quiet/punctual).

2. Name steps involved in automotive shop work by checking the steps below which are involved in automotive shop work.

_____a. Measuring

_____b. Disassembly

_____c. Price gouging

_____d. Metal work or machining

_____e. Plastering

_____f. Installing new parts

_____g. Designing emission control devices

_____h. Reassembly

_____i. Adjustments

_____j. Retailing

3. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, proceed to LAP Step 9. Otherwise, continue to LAP Step 8.

ORIENTATION AND SAFETY
UNIT I

LAP ASSIGNMENT SHEET #4--AUTOMOTIVE SHOPWORK

NAME_____ SCORE_____

1. List student requirements for the auto mechanics program by completing the following statements.

   a. Operate the _____ _____ correctly.

   b. Be _____ conscious; follow _____ _____.

   c. Take _____ readily; follow _____.

   d. Be a _____ _____.

   e. Control _____.

   f. Have _____ about _____.

   g. Have _____ in the _____.

   h. Be conscious of _____ in _____ and _____.

   i. Be _____.

2. Name steps involved in automotive shop work by completing the following statements.

   a. M_____

   b. D_____

   c. M_____ w_____ or m_____

   d. I_____ n_____ p_____

   e. R_____

   f. A_____

3. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 9. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 9.

ORIENTATION AND SAFETY
UNIT I

LAP ASSIGNMENT SHEET #5--VICA

NAME _____ SCORE _____

1. Describe the VICA organization by unscrambling the words below to give a clear description.

   trade in state students who are associated with local advisors and education made industrial up or enrolled national and organization of and

   _____ _____ _____ _____ _____

   _____ _____ _____ _____ _____

   _____ _____ _____ _____ _____

   _____ _____ _____ _____ _____

   _____ _____

2. There are many reasons for joining VICA, but none of them are the reasons given below. Someone typed in the wrong words. Read each statement and mark out the incorrect words. Write the correct words in the blanks provided.

   a. VICA brings together students with common interests so they can exchange stamps, discuss albums, and share common porpoises.

      _____ _____ _____

   b. VICA is the only national organization designed exclusively for tired, dusty, and practical students.

      _____ _____ _____

   c. VICA offers greater leadership envelop oppossums.

      _____ _____

   d. VICA offers presses and preignition through a national organization.

      _____ _____

   e. VICA offers opportunitites to itself through a national telegram of alarms and protests.

      _____ _____ _____

f. VICA serves to broaden perspectives through a national margarine and a system of interesting and entertaining communications.

_____ _____ _____

g. VICA offers cocurricular activities to give a student more than octopus skill development and make eradication and straining meaningful.

_____ _____ _____

h. VICA membership offers an automatic subscription to the national magazine, Life, and the newsletter, Chicago Tribune.

_____ _____ _____

i. VICA members receive membership scars as evidence of their fights and pilgramages as members.

_____ _____ _____

j. VICA offers purchase of supplies, pins, and other club juries, apparitions, and manners for its members.

_____ _____ _____

3. Discuss ways VICA state and national dues are used by using the following word-search to complete the outline below. The answers for the quiz are written forward and backward and hidden horizontally, vertically, and diagonally in the block of letters.

P	S	R	E	T	T	E	L	S	W	E	N	W
U	R	V	Y	S	A	L	A	R	I	E	S	I
B	C	O	O	B	D	W	H	L	M	M	I	N
L	I	N	F	O	R	M	A	T	I	O	N	N
I	T	S	F	E	T	G	T	R	Q	C	S	E
C	K	N	I	U	S	R	J	N	D	W	U	R
A	W	I	C	S	R	S	A	M	E	S	R	S
T	E	X	E	C	U	T	I	V	E	R	A	E
I	S	N	R	T	F	D	C	O	E	J	N	I
O	S	E	S	N	E	P	X	E	N	L	C	L
N	E	Q	U	I	P	M	E	N	T	A	E	P
S	N	P	I	H	S	R	E	D	A	E	L	P
B	I	C	J	G	S	D	R	A	C	H	D	U
M	A	G	A	Z	I	N	E	E	B	K	F	S

a. National dues

(1) Printing

(a) Membership _____

(b) VICA _____

(c) _____ packets for clubs

(d) VICA _____

(e) VICA _____ news

(2) Contest

(a) _____

(b) Space and _____

(c) _____ expenses

(3) Recurring expenses

(a) National staff members' _____

(b) Office _____

(c) Utilities, telephone, _____, and legal fees

(d) Office _____

b. State dues

(1) _____ training conference

(2) _____ committee meetings

(3) Travel and _____ for

(a) State contest _____ to national contest

(b) State _____

(4) State _____

4. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, proceed to LAP Step 12. Otherwise, continue to LAP Step 11.

ORIENTATION AND SAFETY
UNIT I

LAP ASSIGNMENT SHEET #6--VICA

NAME_____ SCORE_____

1. Describe the VICA organization.

2. List at least five reasons for joining VICA.

   a.

   b.

   c.

   d.

   e.

3. Discuss the ways VICA state and national dues are used.

   a. National dues

b. State dues

4. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 12. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 12.

State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO. _____ CODE: _____

MAJOR INSTRUCTIONAL AREA

ORIENTATION AND SAFETY

INSTRUCTIONAL UNIT

SAFETY
SECTION A--UNIT II

LEARNING ACTIVITY PACKET NO.

2

PREREQUISITE LAP(S)

1

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities for "Safety." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training.

INTRODUCTION: The course of study in this LAP will help the student become able to list rules for personal and shop safety and rules for safe use of shop equipment and materials. Additionally, the student will become familiar with the procedures for conducting a shop safety inspection checklist.

TASKS INCLUDED IN THIS LAP:

None

AUTO MECHANICS I
SAFETY

SECTION A--UNIT II

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps.

_____1.	Read	Unit and Specific Objectives, page 17-A.
_____2.	Study	The Information Sheet, pages 21-A through 28-A.
_____3.	Watch	Slide/tape presentation, "Shop Safety" Parts I and II (A-II).
_____4.	Do	Assignment Sheet #1--Safety Pledge Form, page 33-A.
_____5.	Do	Assignment Sheet #2--Individual Student Shop Safety Inspection, pages 35-A through 37-A.
_____6.	Discuss	Your Safety Inspection with your instructor.
_____7.	Do	Assignment Sheet #3--Review Questions, pages 39-A through 48-A.
_____8.	Stop.	Have your instructor evaluate your Assignment Sheet. If your instructor is satisified with your performance, proceed to LAP Step 10. Otherwise, continue to LAP Step 9.
_____9.	Do	LAP Assignment Sheet #1, LAP page 3.

_____10. Review Information Sheet, pages 21-A through 28-A, and Assignment Sheets.

_____11. Take Safety Unit II Test (see your instructor). If you score 85 percent or more, continue to the next assigned Learning Activity Packet. Otherwise, ask your instructor about additional study requirements and possible re-testing.

ORIENTATION AND SAFETY
UNIT II

LAP ASSIGNMENT SHEET #1--SAFETY

NAME_____ SCORE_____

1. Define the following terms.

   a. First aid--

   b. Safety--

   c. OSHA--

   d. Accident--

2. Write the correct safety code color in the blank provided with each statement of use below.

   _____a. Portable containers of flammable liquids.

   _____b. Radiation hazards.

   _____c. Location of first aid equipment other than fire fighting equipment.

   _____d. Waste containers for explosive materials.

   _____e. Caution warning such as for a physical hazard.

   _____f. Dangerous parts of machines.

   _____g. Fire protection equipment and its location.

   _____h. The exposed edges of pulleys, gears, rollers, cutting devices, and power jaws.

   _____i. Traffic flow.

   _____j. The starting point or power source of machinery.

   _____k. Emergency stop bars, stop buttons, and emergency electrical stop switches on machinery.

3. List personal safety rules by explaining how each of the following words or phrases applies to personal safety.

   a. Clothing -- _____

   _____

b. Long hair -- _____

_____

c. Eye protection -- _____

_____

d. Ties -- _____

_____

e. Jewelry -- _____

_____

f. Personal conduct -- _____

_____

g. Soap and water -- _____

_____

4. List rules for general shop safety by explaining how each of the following words or phrases applies to personal safety.

a. Heavy objects -- _____

_____

b. Equipment safety devices -- _____

_____

c. Equipment defects -- _____

_____

d. Accident reporting -- _____

_____

e. Power -- _____

_____

f. Scraps and litter -- _____

_____

g. Oily shop towels -- _____

_____

h. Moving about the shop -- _____

_____

i. Hazardous machines -- _____

_____

j. Horseplay -- _____

_____

k. Compressed air -- _____

_____

l. Tripping hazards -- _____

_____

m. Cotter keys, bolts, lock washers -- _____

_____

n. Brake fluid -- _____

_____

o. Hazardous conditions -- _____

_____

5. List safety rules for each of the following hand tools.

a. General hand tools.

1)

2)

3)

4)

b. Cold chisels

1)

2)

3)

4)

c. Screwdrivers

1)

2)

3)

4)

d. Pliers

1)

2)

3)

4)

e. Hammers

1)

2)

3)

4)

f. Vises

1)

2)

3)

4)

5)

6. List four safety rules involving the engine.

a.

b.

c.

d.

7. List five safety rules involving the battery.

   a.

   b.

   c.

   d.

   e.

8. List safety rules involving flammable liquids by explaining how each of the following words or phrases applies to flammable liquid safety.

   a. Storage -- _____

   _____

   b. Fuel leaks -- _____

   _____

   c. Cleaning parts -- _____

   _____

   d. Soaked clothing -- _____

   _____

   e. Amounts of flammable liquids -- _____

   _____

   f. Fire extinguishers -- _____

   _____

9. List equipment safety rules by doing the following:

   a. List four safety rules for using the bench grinder.

      1)

      2)

      3)

      4)

b. List safety rules for lifting devices by explaining how the following words or phrases apply to lifting device safety.

1) Jack contact on frame -- _____

_____

2) Jack handles -- _____

_____

3) Jack stands -- _____

_____

4) Raising or lowering vehicle -- _____

_____

5) Chain or cable bolts -- _____

_____

6) Instructor -- _____

_____

7) Crane or hoist position -- _____

_____

8) Safety devices -- _____

_____

9) Manufacturer's instructions -- _____

_____

c. Portable electric drive motors.

1) Connecting to power -- _____

_____

2) Chuck keys or shaft locks -- _____

_____

3) Wet equipment and area -- _____

_____

4) Personal protection -- _____

_____

5) Holding equipment -- _____

_____

6) Electrical grounding -- _____

_____

10. Name the components of the fire triangle.

a.

b.

c.

11. Label each of the following types of fire by writing Class A, B, C, or D in the space provided.

_____a. A fire is smoldering in a barrel of magnesium scraps

_____b. Fire due to a fuel pump leak

_____c. Fire in a classroom waste basket

_____d. Fire in a barrel of oil to be recycled

_____e. Fire in a circuit breaker box

_____f. Fire in an office file cabinet

_____g. Fire in the motor of a bench grinder

12. Name the class or classes of fires that the following types of fire extinguishers can be used on by writing A, B, C, or D in the space provided. If the extinguisher can be used on more than one class of fire, be sure to list each class.

_____a. Pressurized water

_____b. Foam

_____c. Dry chemical

_____d. Carbon dioxide (CO_2)

13. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 10. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 10.

State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO. _____ CODE: _____

MAJOR INSTRUCTIONAL AREA

ORIENTATION AND SAFETY

INSTRUCTIONAL UNIT

HAND TOOLS
SECTION A--UNIT III

LEARNING ACTIVITY PACKET NO.

3

PREREQUISITE LAP(S)

1, 2

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities and performance tasks for "Hand Tools." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training and in achieving a Skilled or Moderately Skilled competency level in the performance of jobs associated with this specialty.

INTRODUCTION: The course of study in this LAP will help the student become able to identify hand tools, general shop tools, and special tools for each major area or vehicle repair and to perform maintenance on specific hand tools.

TASKS INCLUDED IN THIS LAP:

1. Sharpen a twist drill.
2. Drill holes with a drill press.
3. Reshape a cold chisel
4. Cut flat metal with a cold chisel.
5. Dress a grinding wheel.
6. Fit a screwdriver.
7. Replace a hammer handle.
8. Check a torque wrench for accuracy.
9. Draw file a flat surface.
10. Draw a twist drill hole to correct center.

AUTO MECHANICS I
HAND TOOLS

SECTION A--UNIT III

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps.

_____1. Read Unit and Specific Objectives, pages 61-A and 62-A.

_____2. Complete Hand Tools Pre-Test, LAP page 11.

_____3. Study The Sections of the Information Sheet, pages 67-A through 74-A, indicated on your Pre-Test. Be sure to study the transparency masters when required.

_____4. Refer To Step 27 of your Pre-Test. If additional study is indicated for any of Sections I-XII, continue to Step 5. Otherwise, proceed to Step 7.

_____5. Do LAP Assignment Sheet #1, LAP page 29.

_____6. Do LAP Assignment Sheet #2, LAP page 37.

_____7. Refer To Step 27 of your Pre-Test. If additional study is indicated for Section XIII, continue to Step 7. Otherwise, proceed to Step 9.

_____8. Do LAP Assignment Sheet #3, LAP page 45.

_____9. Refer To Step 27 of your Pre-Test. If additional study is indicated for Section XIV, continue to Step 10. Otherwise, proceed to Step 11.

_____10. Do — LAP Assignment Sheet #4, LAP page 47.

_____11. Refer — To Step 27 of your Pre-Test. If additional study is indicated for Section XV, continue to Step 12. Otherwise, proceed to Step 13.

_____12. Do — LAP Assignment Sheet #5, LAP page 49.

_____13. Refer — To Step 27 of your Pre-Test. If additional study is indicated for Section XVI, continue to Step 14. Otherwise, proceed to Step 15.

_____14. Do — LAP Assignment Sheet #6, LAP page 51.

_____15. Refer — To Step 27 of your Pre-Test. If additional study is indicated for Section XVII, continue to Step 16. Otherwise, proceed to Step 17.

_____16. Do — LAP Assignment Sheet #7, LAP page 53.

_____17. Refer — To Step 27 of your Pre-Test. If additional study is indicated for Section XVIII, continue to Step 18. Otherwise, proceed to Step 19.

_____18. Do — LAP Assignment Sheet #8, LAP page 55.

_____19. Refer — To Step 27 of your Pre-Test. If additional study is indicated for Section XIX, continue to Step 20. Otherwise, proceed to Step 21.

_____20. Do — LAP Assignment Sheet #9, LAP page 57.

_____21. Refer — To Step 27 of your Pre-Test. If additional study is indicated for Section XX, continue to Step 22. Otherwise, proceed to Step 23.

_____22. Do LAP Assignment Sheet #10, LAP page 59.

_____23. Refer To Step 27 of your Pre-Test. If additional study is indicated for Section XXI, continue to Step 24. Otherwise, proceed to Step 25.

_____24. Do LAP Assignment Sheet #11, LAP page 61.

_____25. Refer To Step 27 of your Pre-Test. If additional study is indicated for Section XXII, continue to Step 26. Otherwise, proceed to Step 27.

_____26. Do LAP Assignment Sheet #12, LAP page 63.

_____27. Refer To Step 27 of your Pre-Test. If additional study is indicated for Section XXIII, continue to Step 28. Otherwise, proceed to Step 29.

_____28. Do LAP Assignment Sheet #13, LAP page 65.

_____29. Refer To Step 27 of your Pre-Test. If additional study is indicated for Section XXIV, continue to Step 30. Otherwise, proceed to Step 31.

_____30. Do LAP Assignment Sheet #14, LAP page 67.

_____31. Refer To Step 27 of your Pre-Test. If additional study is indicated for Section XXV, continue to Step 32. Otherwise, proceed to Step 33.

_____32. Do LAP Assignment Sheet #15, LAP page 69.

_____33. Refer To Step 27 of your Pre-Test. If additional study is indicated for Section XXVI, continue to Step 34. Otherwise, proceed to Step 35.

_____34. Do LAP Assignment Sheet #16, LAP Page 71.

_____35. Check The tasks below which you feel that you can perform without supervision.

Student Check		Instructor Initials/Date	
		Skilled	Moderately Skilled
_____a.	Sharpen a twist drill (38)	_____	_____
_____b.	Drill holes with a drill press (43)	_____	_____
_____c.	Reshape a cold chisel (48)	_____	_____
_____d.	Cut flat metal with a cold chisel (53)	_____	_____
_____e.	Dress a grinding wheel (58)	_____	_____
_____f.	Fit a screwdriver (63)	_____	_____
_____g.	Replace a hammer handle (68)	_____	_____
_____h.	Check a torque wrench for accuracy (73)	_____	_____
_____i.	Draw file a flat surface (78)	_____	_____
_____j	Draw a twist drill hole to correct center (83)	_____	_____

_____36. Discuss Your competency in each task with your instructor. Your instructor will initial each task in which you demonstrate sufficient competency. If all tasks have been initialed, proceed to Step 88. Otherwise, continue to Step 37.

_____37. Refer To Step 35a. If this task has been initialed, proceed to Step 42. Otherwise, continue to Step 38.

_____38. Study Job Sheet #1--Sharpen a Twist Drill, page 133-A.

_____39. Do Job Sheet #1--Sharpen a Twist Drill.

_____40. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35a and proceed to Step 42. Otherwise, repeat Steps 38 and 39 and then go to Step 41.

_____41. Stop Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35a and continue to Step 42. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35a and continue to Step 42.

_____42. Refer To Step 35b. If this task has been initialed, proceed to Step 47. Otherwise, continue to Step 43.

_____43. Study Job Sheet #2--Drill Holes with a Drill Press, page 135-A.

_____44. Do Job Sheet #2--Drill Holes with a Drill Press

_____45. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35b and proceed to Step 47. Otherwise, repeat Steps 43 and 44 and then go to Step 46.

_____46. Stop Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35b and continue to Step 47. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35b and continue to Step 47.

_____47. Refer — To Step 35c. If this task has been initialed, proceed to Step 52. Otherwise, continue to Step 46.

_____48. Study — Job Sheet #3--Reshape a Cold Chisel, page 173-A.

_____49. Do — Job Sheet #3--Reshape a Cold Chisel.

_____50. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35c and proceed to Step 52. Otherwise, repeat Steps 48 and 49 and then go to Step 51.

_____51. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35c and continue to Step 52. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35c and continue to Step 52.

_____52. Refer — To Step 35d. If this task has been initialed, proceed to Step 57. Otherwise, continue to Step 53.

_____53. Study — Job Sheet #4--Cut Flat Metal with a Cold Chisel, page 139-A.

_____54. Do — Job Sheet #4--Cut Flat Metal with a Cold Chisel.

_____55. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35d and proceed to Step 57. Otherwise, repeat Steps 53 and 54 and then go to Step 56.

_____56. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35d and continue to Step 57. If additional

study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35d and continue to Step 57.

_____57. Refer — To Step 35e. If this task has been initialed, proceed to Step 62. Otherwise, continue to Step 58.

_____58. Study — Job Sheet #5--Dress a Grinding Wheel, page 141-A.

_____59. Do — Job Sheet #5--Dress a Grinding Wheel.

_____60. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35e and proceed to Step 62. Otherwise, repeat Steps 58 and 59 and then go to Step 61.

_____61. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35e and continue to Step 62. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35e and continue to Step 62.

_____62. Refer — To Step 35f. If this task has been initialed, proceed to Step 67. Otherwise, continue to Step 63.

_____63. Study — Job Sheet #6--Fit a Screwdriver, page 143-A.

_____64. Do — Job Sheet #6--Fit a Screwdriver.

_____65. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35f and proceed to Step 67. Otherwise, repeat Steps 63 and 64 and then go to Step 66.

_____66. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35f and continue to Step 67. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35f and continue to Step 67.

_____67. Refer To Step 35g. If this task has been initialed, proceed to Step 72. Otherwise, continue to Step 68.

_____68. Study Job Sheet #7--Replace a Hammer Handle.

_____69. Do Job Sheet #7--Replace a Hammer Handle.

_____70. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35g and proceed to Step 72. Otherwise, repeat Steps 68 and 69 and then go to Step 71.

_____71. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35g and continue to Step 72. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35g and continue to Step 72.

_____72. Refer To Step 35h. If this task has been initialed, proceed to Step 77. Otherwise, continue to Step 73.

_____73. Study Job Sheet #8--Check Torque Wrench for Accuracy, page 149-A.

_____74. Do Job Sheet #8--Check Torque Wrench for Accuracy.

_____75. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35h and proceed to Step 77. Otherwise, repeat Steps 73 and 74 and then go to Step 76.

_____76. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35h and continue to Step 77. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35h and continue to Step 77.

_____77. Refer To Step 35i. If this task has been initialed, proceed to Step 82. Otherwise, continue to Step 78.

_____78. Study Job Sheet #9--Draw File Flat Surface, page 151-A.

_____79. Do Job Sheet #9--Draw File a Flat Surface.

_____80. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35i and proceed to Step 82. Otherwise, repeat Steps 78 and 79 and then go to Step 81.

_____81. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35i and continue to Step 82. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35i and continue to Step 82.

_____82. Refer To Step 35j. If this task has been initialed, proceed to Step 87. Otherwise, continue to Step 83.

_____83. Study — Job Sheet #10--Draw a Twist Drill Hole to Correct Center, page 153-A.

_____84. Do — Job Sheet #10--Draw a Twist Drill Hole to Correct Center.

_____85. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35j, and proceed to Step 87. Otherwise, repeat Steps 83 and 84 and then go to Step 86.

_____86. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 35j and continue to Step 87. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 35j and continue to Step 87.

_____87. Refer — To Step 35. If all tasks have been initialed, continue to Step 88. Otherwise, refer to the step indicated in parentheses after the unsigned task.

_____88. Review — Information Sheet (page 67-A) and Assignment Sheets.

_____89. Take — Hand Tools Unit III Test (see your instructor). If your score is 85 percent or more, continue to the next assigned Learning Activity Packet. Otherwise, ask your instructor about additional study requirements and possible re-testing.

HAND TOOLS
UNIT III

PRE-TEST

NAME_____ SCORE_____

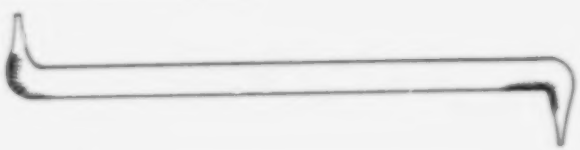
DIRECTIONS: This test is to determine how much you already know about hand tools. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you are certain of the answer. Guessing may prevent you from receiving the lessons which are required.

1. Write the purpose of tools.

2. Identify the following types of screwdrivers.

a._____

b._____



c._____

d. _____

e. _____

3. Identify the following types of pliers.

a. _____

b. _____

c. _____

d. _____

e. _____

4. Identify the following types of wrenches.

a. _____

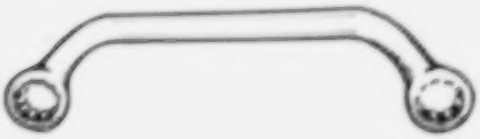
b. _____

c. _____

d. _____

e. _____

f. _____



g. _____

h. _____

5. Identify the following components of a socket set.

a. _____

b. _____

c. _____

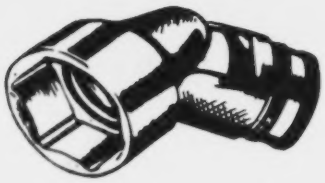
e. _____

d. _____

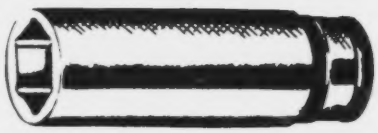
f. _____

g. _____

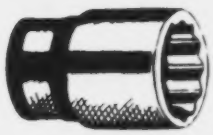
6. Identify the following types of sockets.



a._____



b._____

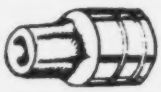


c._____

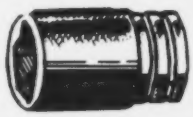
7. Identify the following special purpose sockets

a._____

b._____

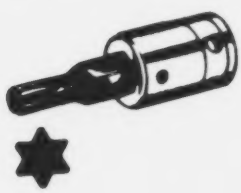


c._____



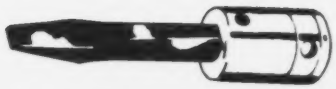
d._____

e._____



f._____

g._____

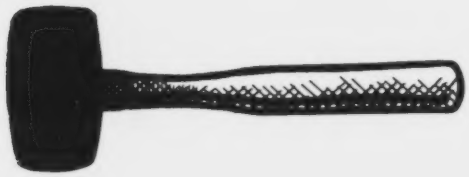


h._____

i._____

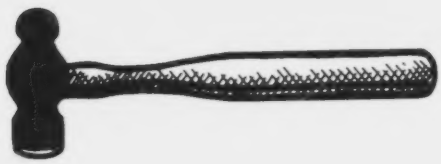
j._____

8. Identify the following types of hammers used in the auto shop.



a._____

b._____



c._____

d._____

9. Identify the following types of punches.

a._____

b._____

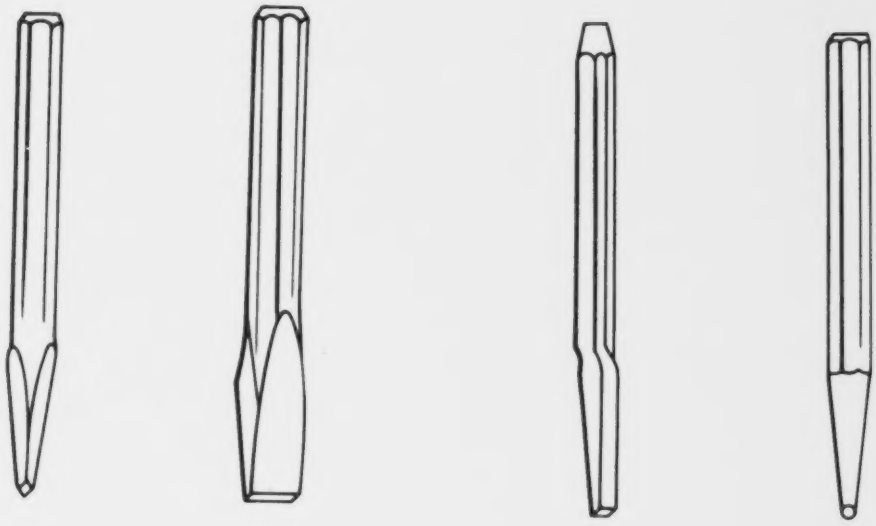
16

c._____

d._____

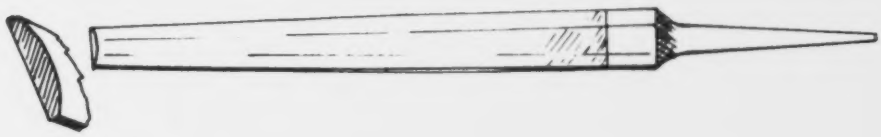
e._____

10. Identify the following types of chisels.



a._____ b._____ c._____ d._____

11. Identify the following types of files.



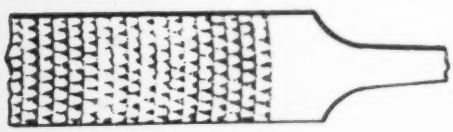
a._____

b. _____

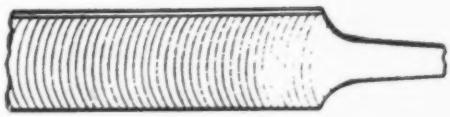
c. _____

d. _____

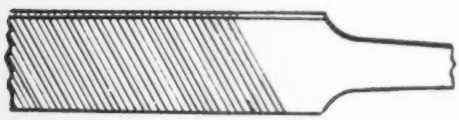
12. Identify the following types of file teeth.



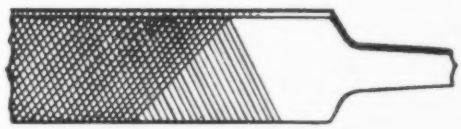
a. _____



b. _____



c. _____



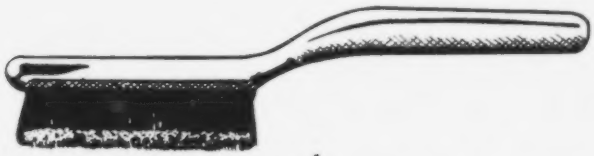
d. _____

13. Identify the following parts cleaning tools.

a. _____

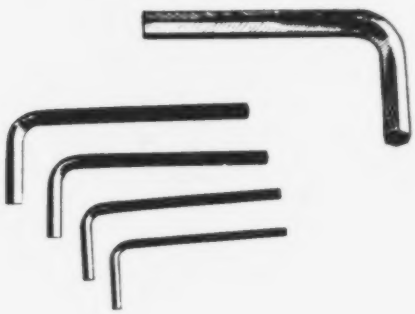
b. _____

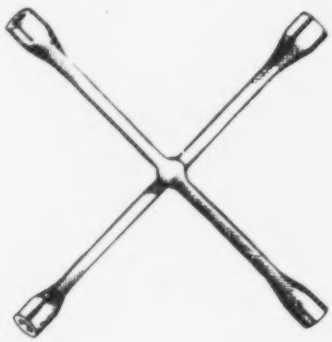
c. _____



d. _____

14. Identify the following general shop tools.

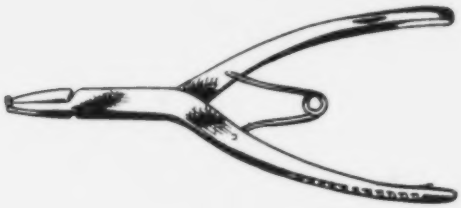




a. _____ b. _____

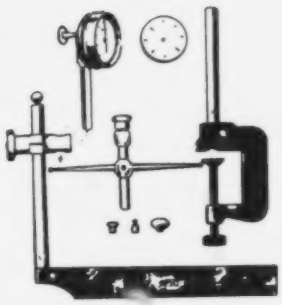
c. _____

d. _____

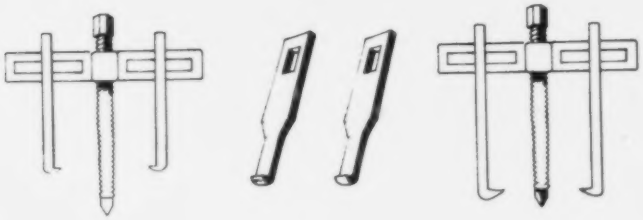


e. _____

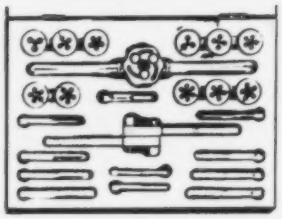
f. _____



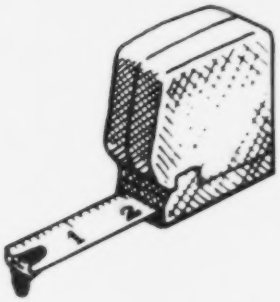
g. _____



h. _____



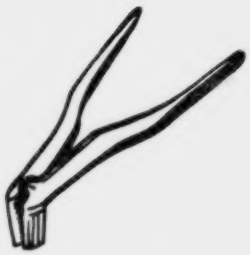
i. _____



j. _____

15. Identify the following battery service tools.

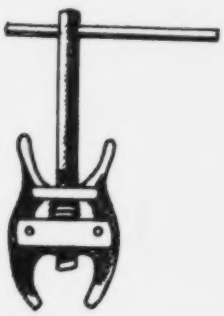
a._____



b._____

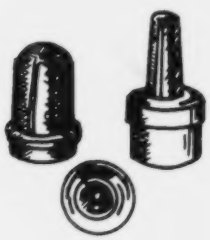
c._____

d._____



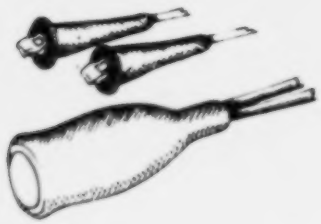
e._____

f._____



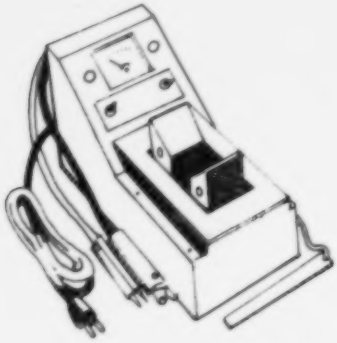
g._____

16. Identify the following starter service tools.

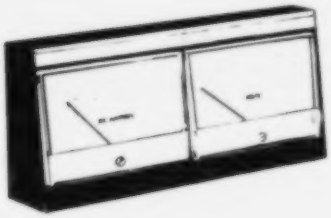


a. _____

b. _____

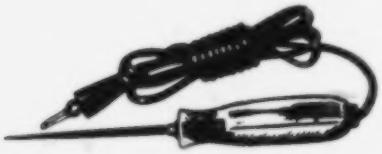


c. _____

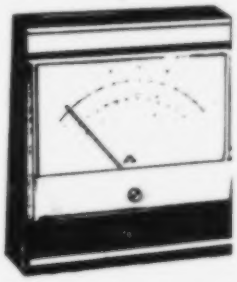


d. _____

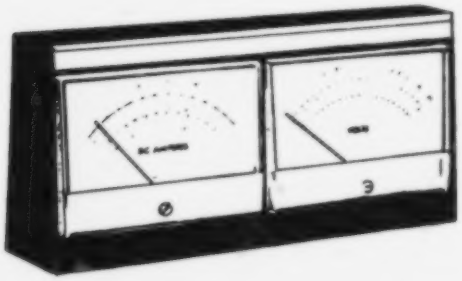
17. Identify the following charging system service tools.



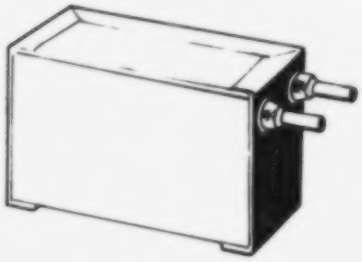
a. _____



b. _____



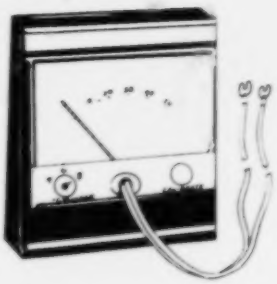
c. _____



d. _____

18. Identify the following ignition service tools.

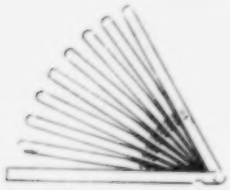
a._____



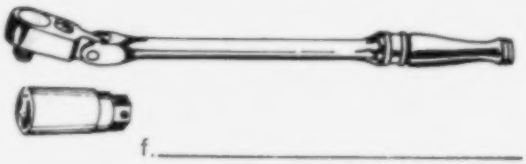
b._____

c._____

d._____



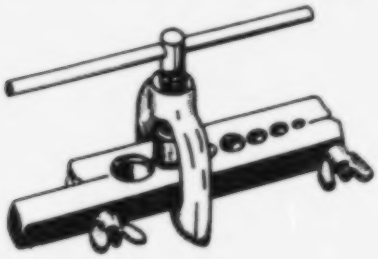
e._____



f._____

g._____

19. Identify the following fuel system service tools.



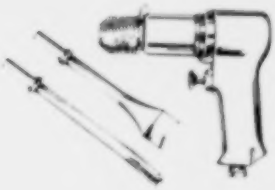
a._____

b._____

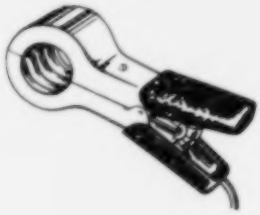
c._____

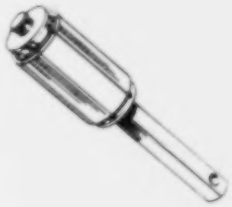
20. Identify the following exhaust service tools.

a. _____ b. _____



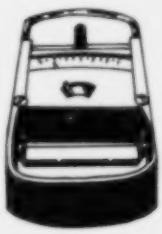
c. _____ d. _____





e. _____ f. _____

21. Identify the following cooling system service tools.



a. _____ b. _____

24

c. _____

d. _____

e. _____

f. _____

22. Identify the following lubrication service tools.

a. _____

b. _____

c. _____

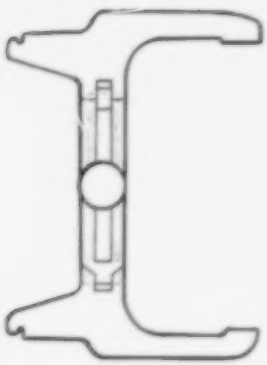
e. _____

d. _____

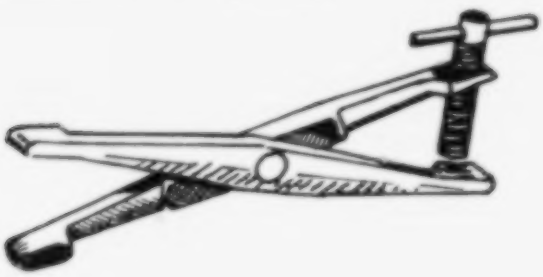
f. _____

g. _____

23. Identify the following brake service tools.



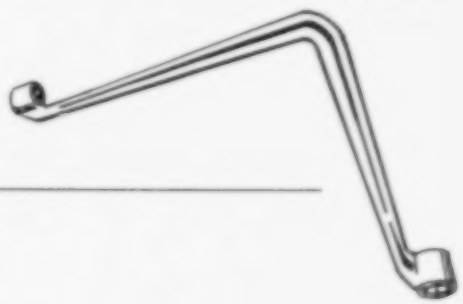
b. _____



a. _____

c. _____

d. _____

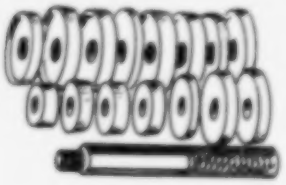


e. _____

f. _____

g. _____

24. Identify the following front-end service tools.



b. _____

a. _____

d. _____

c. _____ e. _____

25. Identify the following engine repair tools.

a. _____ c. _____

b. _____

d. _____

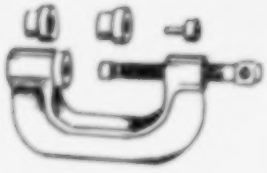
e. _____

f. _____

g. _____

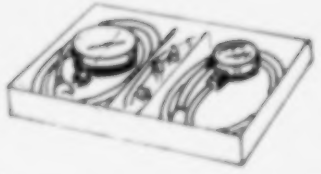
h. _____

26. Identify the following drive line tools.



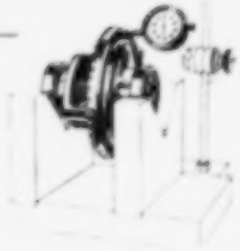
a. _____

b. _____



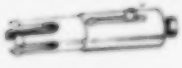
c. _____

d. _____



e. _____

f. _____



g. _____

h. _____

i. _____

_____27. Stop Have your instructor evaluate your Pre-Test and mark the areas below which require additional study.

Refer to Information Sheet, Sections:

_____I	_____XIV
_____II	_____XV
_____III	_____XVI
_____IV	_____XVII
_____V	_____XVIII
_____VI	_____XIX
_____VII	_____XX
_____VIII	_____XXI
_____IX	_____XXII
_____X	_____XXIII
_____XI	_____XXIV
_____XII	_____XXV
_____XIII	_____XXVI

You came here from LAP Step 2. If any of the above study is checked, continue to LAP Step 3. Otherwise proceed to LAP Step 33.

ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #1--HAND TOOLS

NAME _____ SCORE _____

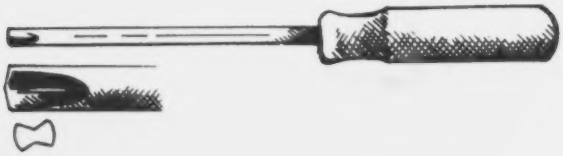
1. Write the purpose of tools by completing the following statement.

   To allow the mechanic to perform a variety of _____ _____ quickly and _____.

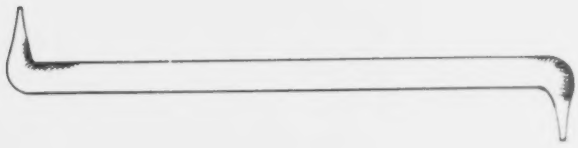
2. Identify the following types of screwdrivers by selecting the correct name from the list below and writing it in the space provided.

   Clutch
   Offset
   Reed and prince
   Phillips
   Standard or common

a. _____



b. _____



c. _____

d. _____

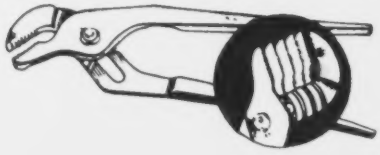
e. _____

3. Identify the following types of pliers by selecting the correct name from the list below and writing it in the space provided.

Channel lock
Diagonal side cutter
Lock grip
Slip joint
Needle nose

a. _____

b. _____



c. _____

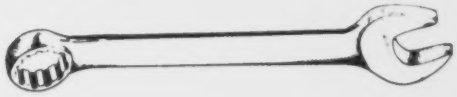
d. _____

e. _____

4. Identify the following types of wrenches by selecting the correct name from the list below and writing it in the space provided.

Adjustable end wrench
Tubing wrench
Combination end
Pipe wrench
Box end wrench
Open end wrench
Obstruction box end wrench
Flex head wrench

a. _____



b. _____

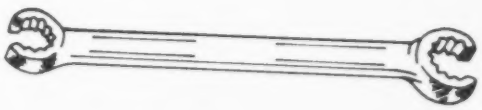
c. _____

d. _____

e. _____

f. _____

g. _____



h. _____

5. Identify the following components of a socket set by selecting the correct name from the list below and writing it in the space provided.

Ratchet handle
Extension
Break-over handle
Speed handle
Socket
Sliding T-handle
Universal joint

a. _____

b. _____

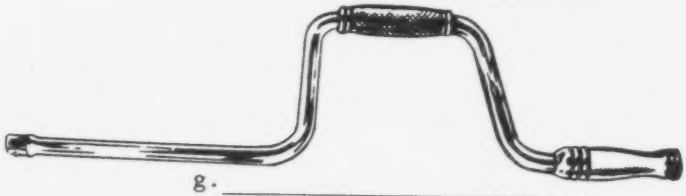
32

c. _____

d. _____

e. _____

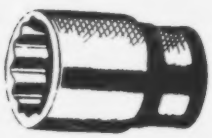
f. _____



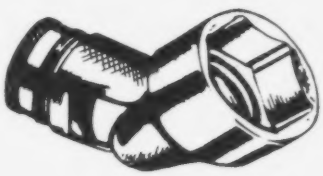
g. _____

6. Identify the following types of sockets by selecting the correct name from the list below and writing it in the space provided.

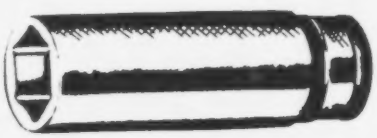
Universal Deep well Standard



a. _____



b. _____



c. _____

7. Identify the following special purpose sockets by selecting the correct name from the list below and writing it in the space provided.

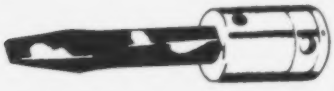
Drag link	Triple square cap
Crowfoot	Prong nut or dash nut
Oil sender	Standard screwdriver
Shock absorber	Phillips screwdriver
Allen or hex head	Clutch screwdriver

a. _____

b. _____

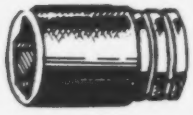
c. _____

d. _____

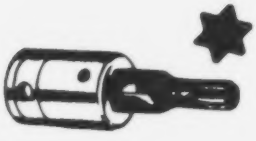


e. _____

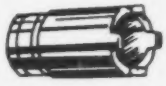
f. _____



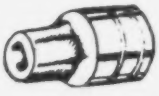
g. _____



h. _____



i. _____



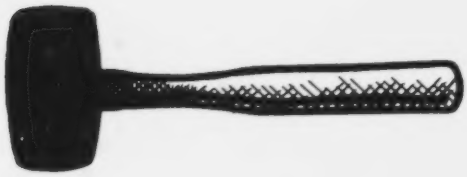
j. _____

8. Identify the following types of hammers used in the auto shop by selecting the correct name from the list below and writing it in the space provided.

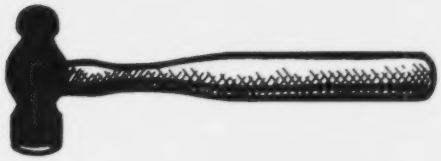
Rubber
Plastic tip
Ball peen
Brass

a._____

b._____



c._____



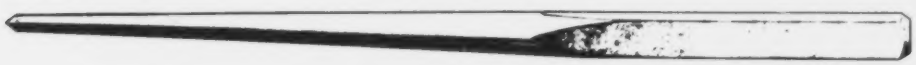
d._____

9. Identify the following types of punches by selecting the correct name from the list below and writing it in the space provided.

Pin
Starting
Drift
Center
Lining-up

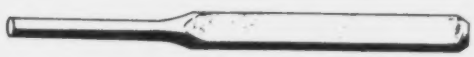
a._____

b._____



c._____

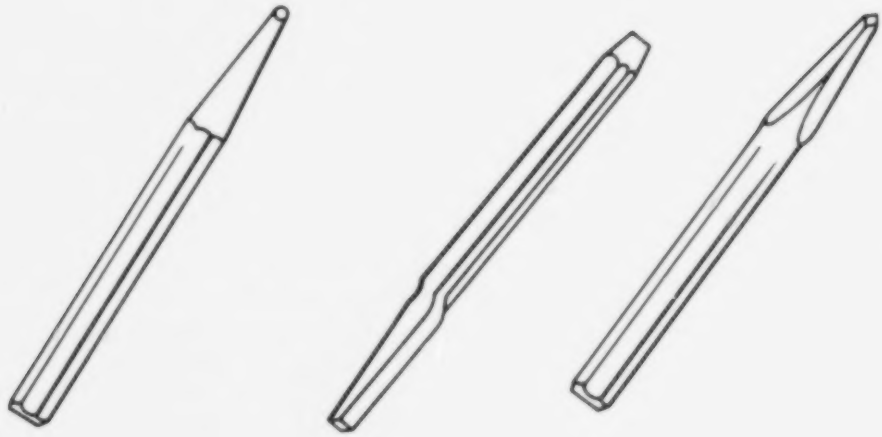
d._____



e._____

10. Identify the following types of chisels by selecting the correct name from the list below and writing it in the space provided.

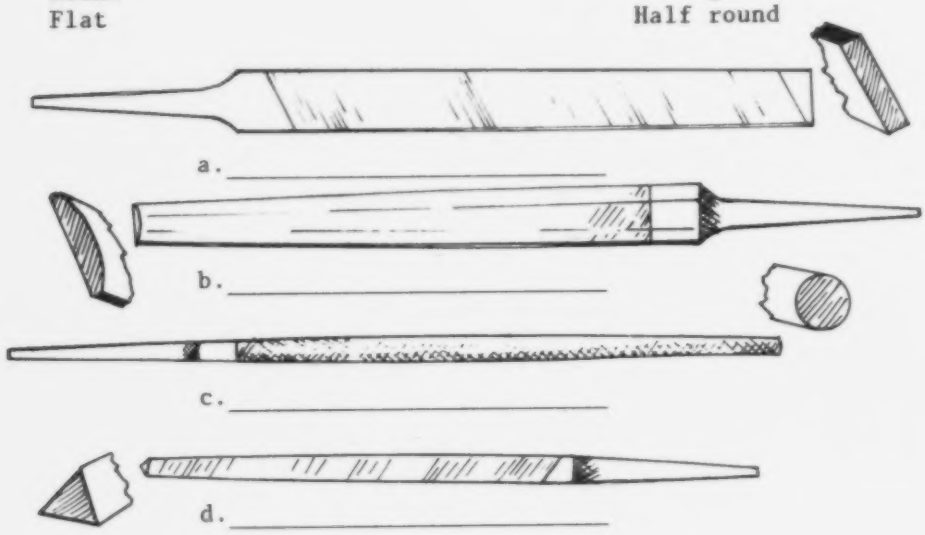
Cape Round nose Diamond point Cold



a._____ b._____ c._____ d._____

11. Identify the following types of files by selecting the correct name from the list below and writing it in the space provided.

Round
Flat
Triangle
Half round



a._____

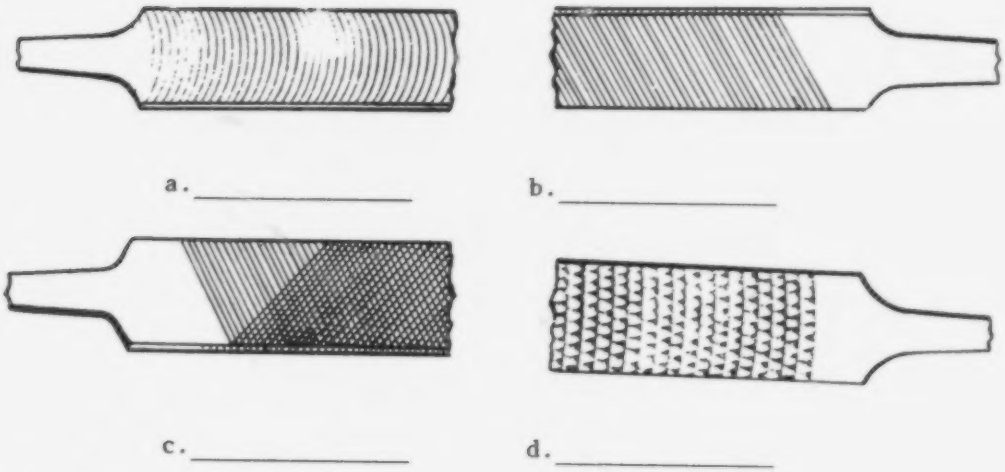
b._____

c._____

d._____

12. Identify the following types of file teeth by selecting the correct name from the list below and writing it in the space provided.

Single cut
Double cut
Rasp cut
Curved



a._____ b._____

c._____ d._____

13. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, proceed to LAP Step 7. Otherwise, continue to LAP Step 6.

ORIENTATION AND SAFETY
UNIT III

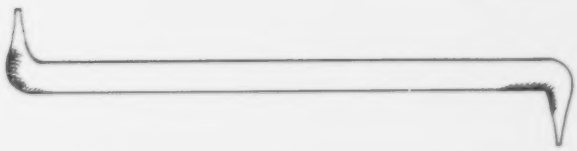
LAP ASSIGNMENT SHEET #2--HAND TOOLS

NAME_____ SCORE_____

1. Write the purpose of tools.

2. Identify the following types of screwdrivers.

a._____



b._____

c._____

d._____

e._____

3. Identify the following types of pliers.

a. _____

b. _____

c. _____

d. _____

e. _____

4. Identify the following types of wrenches.

a. _____

b. _____

c. _____

d. _____

e. _____

f. _____

g. _____

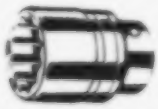
h. _____

5. Identify the following components of a socket set.

a. _____

b. _____

c. _____



e. _____

d. _____

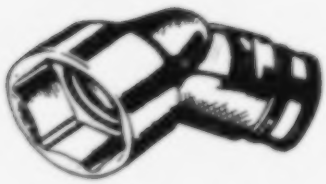
f. _____

g. _____

6. Identify the following types of sockets.

a. _____

b. _____



c._____

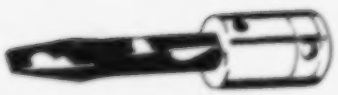
7. Identify the following special purpose sockets.

a._____

b._____

c._____

d._____

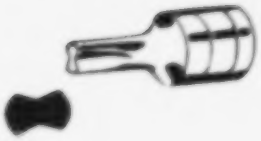


e. _____

f. _____

g. _____

h. _____



i. _____

j. _____

8. Identify the following types of hammers used in the auto shop.

a. _____

b. _____

c. _____

d. _____

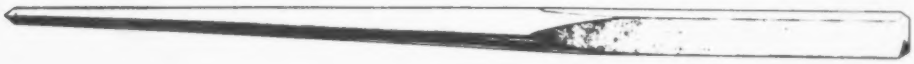
9. Identify the following types of punches.

a._____

b._____

c._____

d._____



e._____

10. Identify the following types of chisels.

a._____

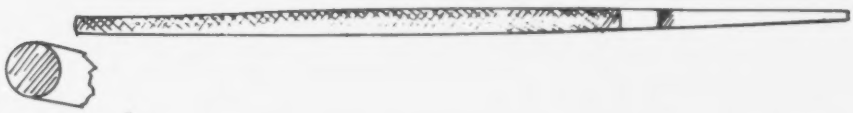
b._____

c._____

d._____

11. Identify the following types of files.

a. _____

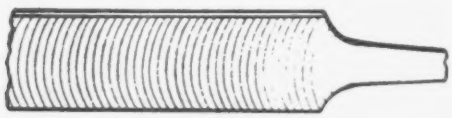


b. _____

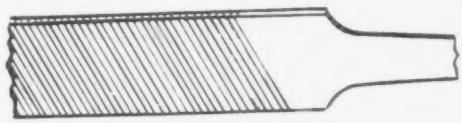
c. _____

d. _____

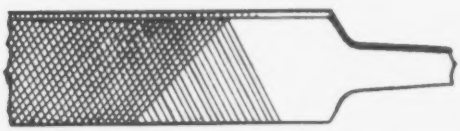
12. Identify the following types of file teeth.



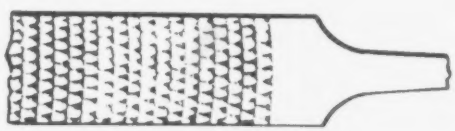
a. _____



b. _____



c. _____



d. _____

13. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 7. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 7.

ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #3--PARTS CLEANING TOOLS

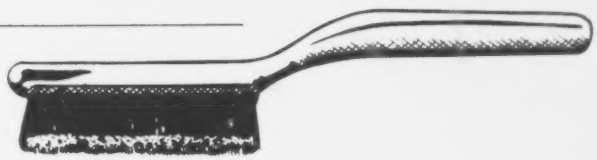
NAME_____ SCORE_____

1. Identify the following parts cleaning tools.

a._____

b._____

c._____



d._____

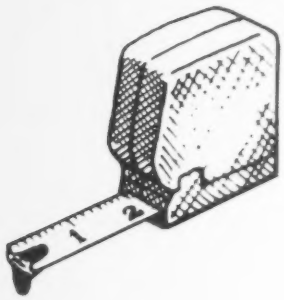
2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 9. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 9.

ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #4--GENERAL SHOP TOOLS

NAME _____ SCORE _____

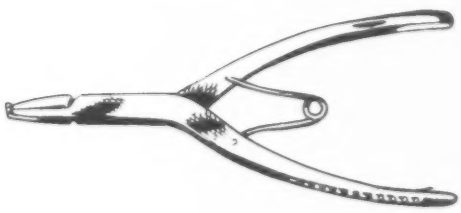
1. Identify the following general shop tools.



a. _____

b. _____

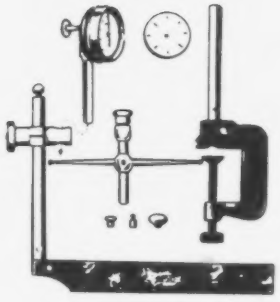
c. _____



d. _____

e. _____

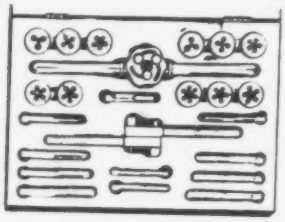
f. _____



g._____

h._____

i._____



j._____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 11. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 11.

ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #5--BATTERY SERVICE TOOLS

NAME _____ SCORE _____

1. Identify the following battery service tools.

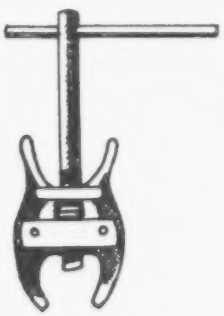
a. _____

b. _____

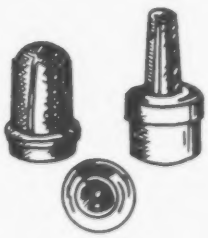
c. _____

d. _____

e. _____



f. _____



g. _____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 13. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 13.

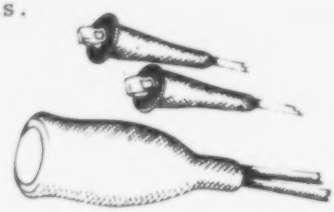
ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #6--STARTER SERVICE TOOLS

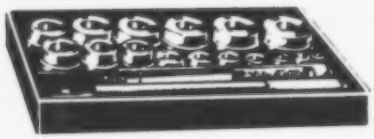
NAME_____ SCORE_____

1. Identify the following starter service tools.

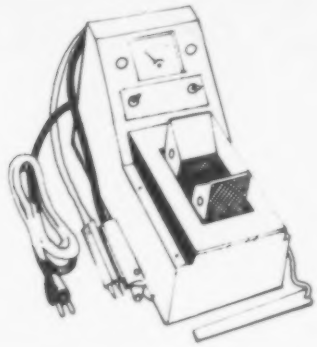
a._____



b._____



c._____



d._____

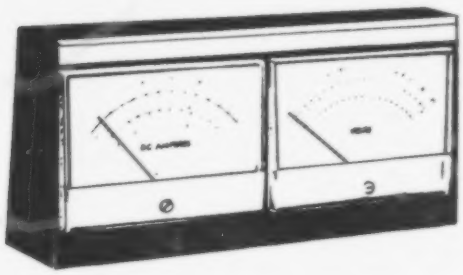
2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 15. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 15.

ORIENTATION AND SAFETY
UNIT III

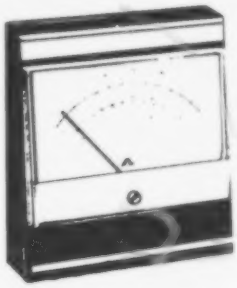
LAP ASSIGNMENT SHEET #7--CHARGING SYSTEM SERVICE TOOLS

NAME_____ SCORE_____

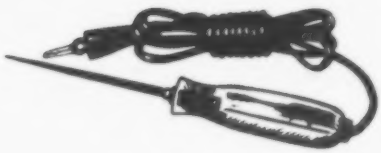
1. Identify the following charging system service tools.



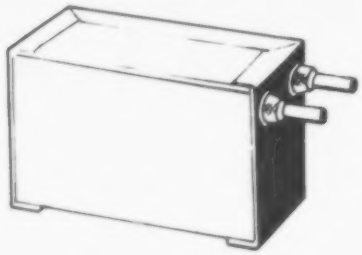
a._____



b._____



c._____



d._____

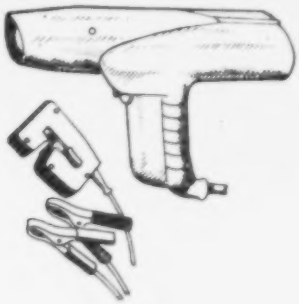
2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 17. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 17.

ORIENTATION AND SAFETY
UNIT III

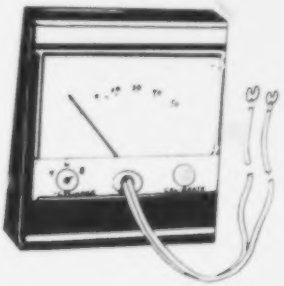
LAP ASSIGNMENT SHEET #8--IGNITION SERVICE TOOLS

NAME_____ SCORE_____

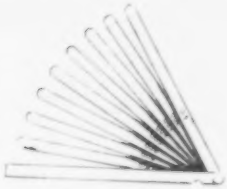
1. Identify the following ignition service tools.



a._____



b._____



c._____

d._____

e._____

f._____

g._____

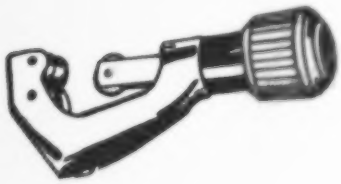
2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 19. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 19.

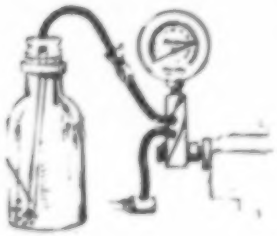
ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #9--FUEL SYSTEM SERVICE TOOLS

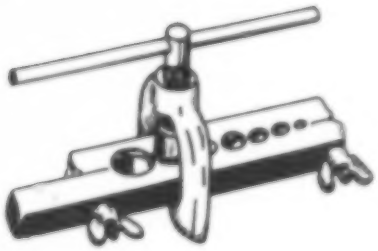
NAME_____ SCORE_____

1. Identify the following fuel system service tools.





a._____ b._____



c._____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 21. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 21.

ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #10--EXHAUST SERVICE TOOLS

NAME_____ SCORE_____

1. Identify the following exhaust service tools.

a._____

b._____

c._____

d._____

e._____

f._____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 23. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 23.

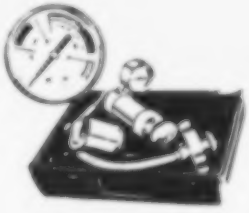
ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #11--COOLING SYSTEM SERVICE TOOLS

NAME_____ SCORE_____

1. Identify the following cooling system service tools

a._____



b._____

c._____

d._____

e._____

f._____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 25. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 25.

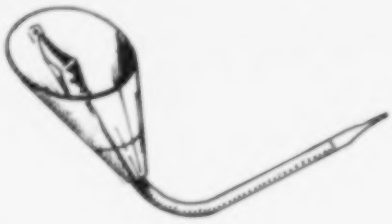
ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #12--LUBRICATION SERVICE TOOLS

NAME_____ SCORE_____

1. Identify the following lubrication service tools.

a._____



b._____

c._____

d._____

e._____

f._____

g._____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 27. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 27.

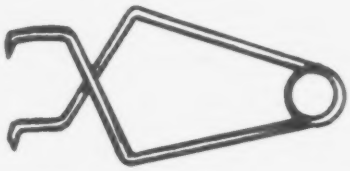
ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #13--BRAKE SERVICE TOOLS

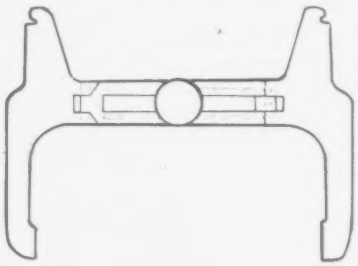
NAME_____ SCORE_____

1. Identify the following brake service tools.

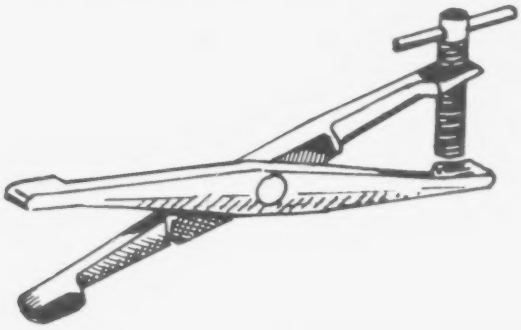
a._____



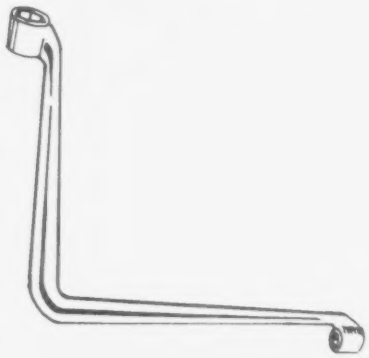
b._____



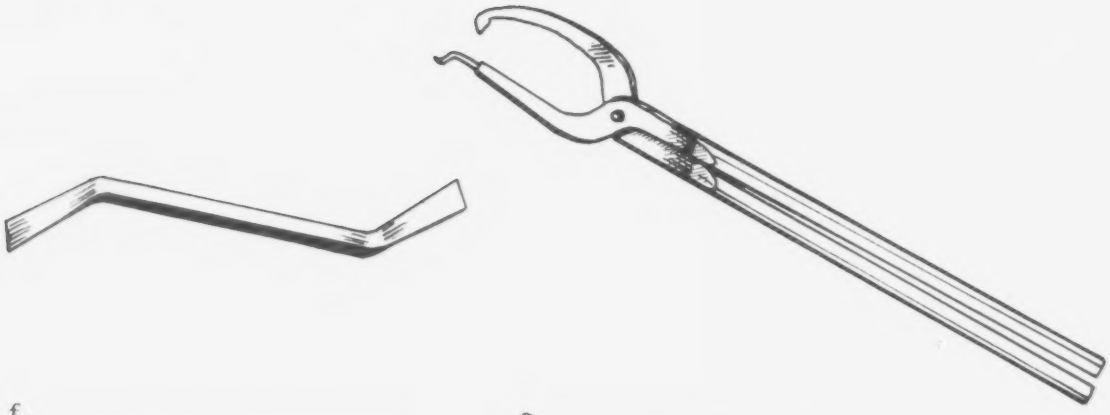
c._____



d._____



e._____



f._____ g._____

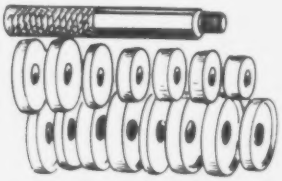
2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 29. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 29.

ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #14--FRONT END SERVICE TOOLS

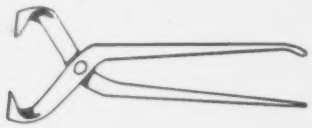
NAME _____ SCORE _____

1. Identify the following front-end service tools.



a. _____ b. _____

c. _____ d. _____



e. _____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 31. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 31.

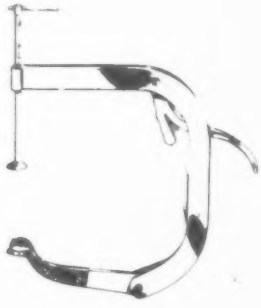
ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #15--ENGINE REPAIR TOOLS

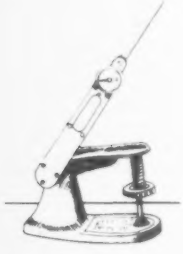
NAME_____ SCORE_____

1. Identify the following engine repair tools.

a._____



b._____



c._____

d._____

e._____

f._____

g._____

h._____

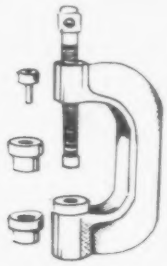
2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 33. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 33.

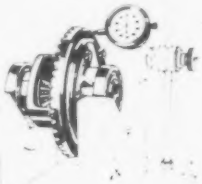
ORIENTATION AND SAFETY
UNIT III

LAP ASSIGNMENT SHEET #16--DRIVE LINE TOOLS

NAME _____ SCORE _____

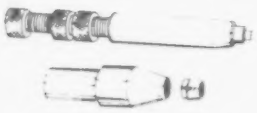
1. Identify the following drive line tools.

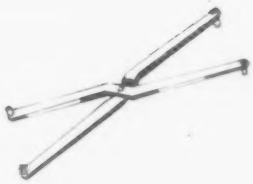




a. _____ b. _____

c. _____ d. _____





e. _____ f. _____

g. _____ h. _____

i. _____

2. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 35. Otherwise, your instructor will show you examples of the tools shown on this Assignment Sheet and discuss their uses and ways of identifying them. Once your instructor is satisfied with your ability to identify these tools, continue to LAP Step 35.

State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO. _____ CODE: _____

MAJOR INSTRUCTIONAL AREA

ORIENTATION AND SAFETY

INSTRUCTIONAL UNIT

ARC WELDING
SECTION A--UNIT IV

LEARNING ACTIVITY PACKET NO.

4

PREREQUISITE LAP(S)

1, 2

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities and performance tasks for "Arc Welding." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training and in achieving a Skilled or Moderately Skilled competency level in the performance of jobs associated with this specialty.

INTRODUCTION: The course of study in this LAP will help the student become able to name and select kinds of arc welding equipment, list safety precautions to observe during arc welding, and perform certain arc welding procedures.

TASKS INCLUDED IN THIS LAP:

1. Start, stop, and restart a bead.
2. Construct a pad weld.
3. Construct a butt weld.

AUTO MECHANICS I
ARC WELDING

SECTION A--UNIT IV

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps

_____1.	Read	Unit and Specific Objectives, pages 177-A and 178-A.
_____2.	Complete	Arc Welding Pre-Test, LAP page 5.
_____3.	Study	The Sections of the Information Sheet, pages 181-A through 187-A, indicated on your Pre-Test. Be sure to study the Transparency Masters when required.
_____4.	Refer	To Step 19 of your Pre-Test. If additional study is indicated for any of Sections I through IX, continue to Step 5. Otherwise, proceed to Step 7.
_____5.	Do	LAP Assignment Sheet #1, LAP page 15.
_____6.	Do	LAP Assignment Sheet #2, LAP page 23.
_____7.	Refer	To Step 19 of your Pre-Test. If additional study is indicated for any of Sections X through XVII, continue to Step 8. Otherwise, proceed to Step 10.
_____8.	Do	LAP Assignment Sheet #3, LAP page 27.
_____9.	Do	LAP Assignment Sheet #4, LAP page 33.

_____10. Check The tasks below which you feel that you can perform without supervision.

Student Check		Instructor Initials/Date	
		Skilled	Moderately Skilled
_____a.	Start, stop, and restart a bead (13)	_____	_____
_____b.	Construct a pad weld (19)	_____	_____
_____c.	Construct a butt weld (25)	_____	_____

_____11. Discuss Your competency in each task with your instructor. Your instructor will initial each task in which you demonstrate sufficient competency. If all tasks have been initialed, proceed to Step 31. Otherwise, continue to Step 12.

_____12. Refer To Step 10a. If this task has been initialed, proceed to Step 18. Otherwise, continue to Step 13.

_____13. Study Job Sheet #1--Start, Stop, and Restart a Bead, page 203 A.

_____14. Watch Slide/tape presentation, "Start, Stop, and Restart the Arc" (Welding Curriculum, E-I-1).

_____15. Do Job Sheet #1--Start, Stop, and Restart a Bead.

_____16. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 10a and proceed to Step 18. Otherwise, repeat Steps 13-15 and then go to Step 17.

_____17. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 10a and continue to Step 18. If additional study is required, discuss a study program with your instructor.

Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 10a and continue to Step 18.

_____18. Refer — To Step 10b. If this task has been initialed, proceed to Step 24. Otherwise, continue to Step 19.

_____19. Study — Job Sheet #2--Construct a Pad Weld, page 205-A.

_____20. Watch — Slide/tape presentation "Make a Pad."

(NOTE: The Welding Curriculum contains presentations for making a pad in each of the four welding positions. These are E-I-2 [flat position], E-II-1 [horizontal position], E-II-4 [vertical up position], and E-II-7 [overhead position]. Your instructor may want you to watch one or more of these presentations if available.)

_____21. Do — Job Sheet #2--Construct a Pad Weld.

_____22. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 10b and proceed to Step 24. Otherwise, repeat Steps 19-21 and then go to Step 23.

_____23. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 10b and continue to Step 24. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 10b and continue to Step 24.

_____24. Refer — To Step 10c. If this task has been initialed, proceed to Step 30. Otherwise, continue to Step 25.

_____25. Study — Job Sheet #3--Construct a Butt Weld, page 207-A.

_____26. Watch — Slide/tape presentation "Make a Square Groove Butt Weld" (Welding Curriculum E-I-3).

_____27. Do — Job Sheet #3--Construct a Butt Weld.

_____28. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 10c and proceed to Step 30. Otherwise, repeat Steps 25-27 and then go to Step 29.

_____29. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 10c and continue to Step 30. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 10c and continue to Step 30.

_____30. Refer — To Step 10. If all tasks have been initialed, continue to Step 31. Otherwise, refer to the step indicated in parentheses after the unsigned task.

_____31. Review — Information Sheet (page 181-A) and Assignment Sheets.

_____32. Take — Arc Welding Unit IV Test (see your instructor). If your score is 85 percent or more, continue to the next assigned Learning Activity Packet. Otherwise, ask your instructor about additional study requirements and possible re-testing.

ARC WELDING
UNIT IV

PRE-TEST

NAME_____ SCORE_____

DIRECTIONS: This test is to determine how much you already know about arc welding. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you are certain of the answer. Guessing may prevent you from receiving the lessons which are required.

1. Match terms on the right to the correct definitions. Definitions continue on next page.

_____a.	Metal to be cut or welded	1. Arc welding
_____b.	Weld made by one pass of an electrode	2. Fusion process
_____c.	Arc welding system	3. Arc
_____d.	Metal rod which conducts a current from the electrode holder to the base metal	4. Base metal
_____e.	Joining together of two or more pieces of metal by the fusion process	5. Crater
_____f.	Depression at the termination of a weld	6. Pass
_____g.	The union of dissimilar metals	7. Bead weld
_____h.	Angular cut made on the vertical edge to allow better weld penetration	8. Bevel
_____i.	That portion of a weld that is molten at the place the heat is supplied	9. Butt joint
_____j.	Process of heating metal to a molten state and allowing it to cool	10. Tack weld
_____k.	Gases used in arc welding	11. Electrode
_____l.	Single longitudinal progression of a welding operation along a joint or weld deposit	12. Puddle
_____m.	Weld between two metal joints on the same plane	13. AWS
_____n.	A device for testing the strength of a weld	

_____o. American Welding Society

_____p. Flow of current across a narrow gap, usually from the tip of the electrode to the base metal

_____q. Weld made to hold parts in proper alignment until the final welds are made

2. List safety precautions used in arc welding by explaining how each of the following words or phrases applies to arc welding safety.

a. Looking at the arc -- _____

_____

b. Head or face shield -- _____

_____

c. Suitable clothing -- _____

_____

d. Striking an arc or while welding if others are in the vicinity -- _____

_____

e. Combustible or flammable materials -- _____

_____

f. Handling hot metal -- _____

_____

g. Ventilation -- _____

_____

h. Power when checking a welder -- _____

_____

i. Handling electrode holder -- _____

_____

j. Worn or frayed cables -- _____

_____

k. Dry footing -- _____

_____

l. Housekeeping -- _____

_____

m. Tool storage -- _____

_____

3. List five types of arc welders.

a.

b.

c.

d.

e.

4. Select from the list below common equipment used in arc welding by placing an "X" in the blanks beside common arc welding equipment.

_____a. Weld machine

_____b. Pliers

_____c. Electrode

_____d. Gloves

_____e. Hacksaw

_____f. Wire brush

_____g. Cart

_____h. Shield or helmet

_____i. Chisel

_____j. Chipping hammer

_____k. Gas tanks

_____l. Ball peen hammer

_____m. Safety goggles or glasses

_____n. Wire crimper

_____o. Screwdriver

_____p. Electrode holder with lead

_____q. Ground clamp with lead

5. List five types of electrodes.

a.

b.

c.

d.

e.

6. List four common sizes of electrodes.

a.

b.

c.

d.

7. Identify what the numbers in the electrode classification system stand for.

Example: E6010

a.

b.

c.

d.

8. Explain how each of the following words or phrases applies to the purposes of electrode coatings.

a. Stabilization -- _____

_____

b. Shielding puddle -- _____

_____

c. Impurities -- _____

_____

d. Slag -- _____

_____

e. Cooling -- _____

_____

f. Speed -- _____

_____

g. Quality of weld -- _____

_____

9. List seven factors to consider in selecting electrodes.

a.

b.

c.

d.

e.

f.

g.

10. Describe the effect on heat production from raising or lowering the current in arc welding.

11. Name two methods of striking an arc.

a.

b.

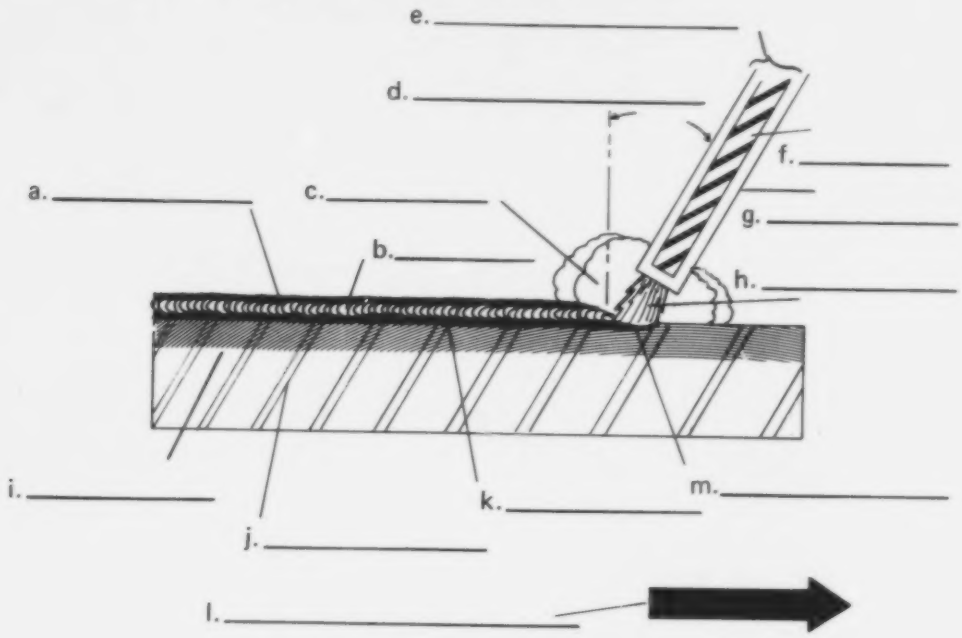
12. Describe the characteristics of proper arc length by answering the following questions.

a. How far from the base metal should the electrode be for a 1/8" electrode? _____

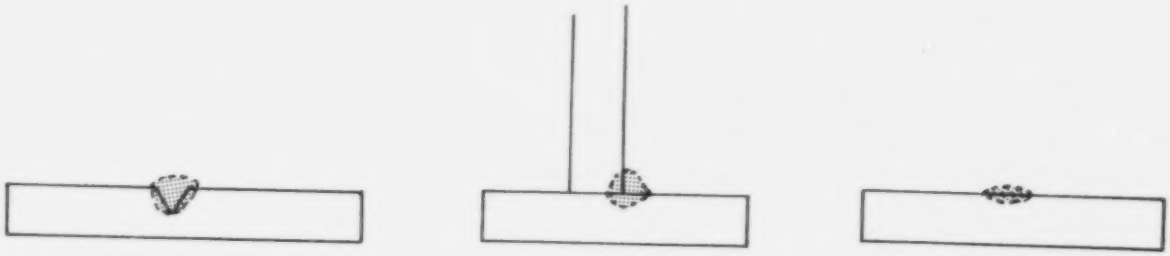
b. What sound does the welder produce when the correct arc length is used?_____

c. What sound is made at the arc when the correct arc length is used?_____

13. Label the parts of the welding process in the drawing below by writing the correct name or description in the blanks.

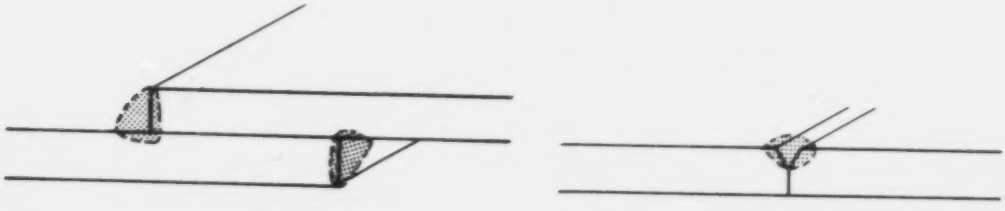


14. Identify the following kinds of welds.

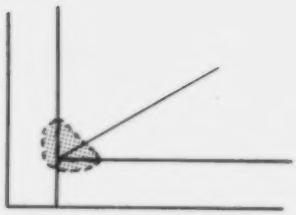


a._____ b._____ c._____

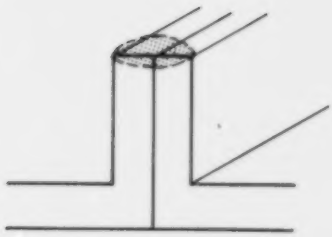
15. Identify the following weld joints.



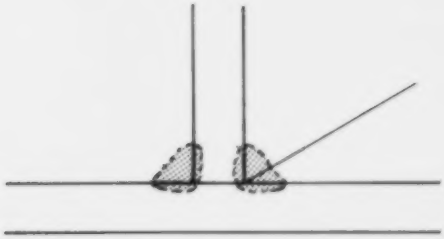
a._____ b._____



c._____



d._____



e._____

16. Name the four welding positions.

    a.

    b.

    c.

    d.

17. List six reasons for a poor weld.

    a.

    b.

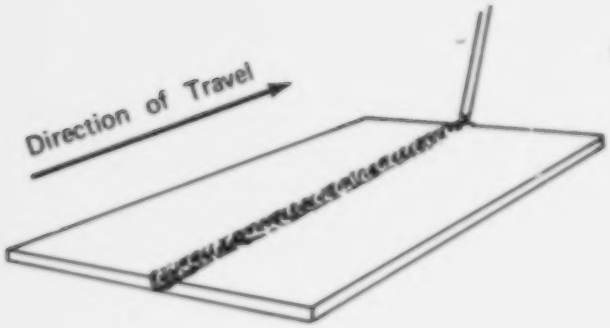
    c.

    d.

    e.

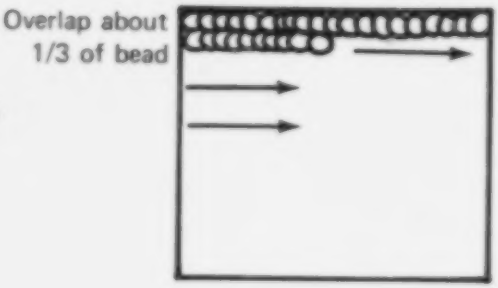
    f.

18. Describe what is being done in each of the following illustrations.



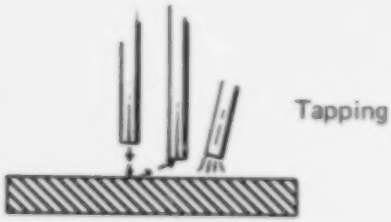
a. _____

_____



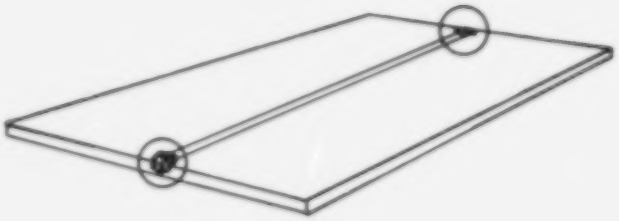
b. _____

_____



c. _____

_____

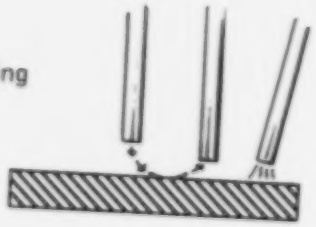


d. _____

_____

e. _____

_____



f. _____

_____

19. Stop. Have your instructor evaluate your Pre-Test and mark the areas below which require additional study.

Refer to the Information Sheet, Sections:

_____I	_____X
_____II	_____XI
_____III	_____XII
_____IV	_____XIII
_____V	_____XIV
_____VI	_____XV
_____VII	_____XVI
_____VIII	_____XVII
_____IX	

You came here from LAP Step 2. If any of the above study areas is checked, continue to LAP Step 3. Otherwise, proceed to LAP Step 10.

ORIENTATION AND SAFETY
UNIT IV

LAP ASSIGNMENT SHEET #1--ARC WELDING PRINCIPLES

NAME_____ SCORE_____

1. Match the terms on the right to the correct definitions.

_____a.	Metal to be cut or welded	1.	Arc
_____b.	Weld made by one pass of an electrode	2.	Butt joint
_____c.	Metal rod which conducts a current from the electrode holder to the base metal	3.	Pass
_____d.	Joining together of two or more pieces of metal by the fusion process	4.	Electrode
_____e.	Depression at the termination of a weld	5.	Base metal
_____f.	Angular cut made on the vertical edge to allow better weld penetration	6.	Bevel
_____g.	That portion of a weld that is molten at the place the heat is supplied	7.	Arc welding
_____h.	Process of heating metal to a molten state and allowing it to cool	8.	AWS
_____i.	Single longitudinal progression of a welding operation along a joint or weld deposit	9.	Fusion process
_____j.	Weld between two metal joints on the same plane	10.	Puddle
_____k.	American Welding Society	11.	Tack weld
_____l.	Flow of current across a narrow gap, usually from the tip of the electrode to the base metal	12.	Crater
_____m.	Weld made to hold parts in proper alignment until the final welds are made	13.	Bead weld

2. List safety precautions in arc welding by completing the following statements.

a. Do not look at the arc without _____ _____.

b. Wear a head or face shield that is in good _____.

c. Wear suitable _____ to protect all parts of the _____.

d. Do not strike an arc or weld until you are sure those in the vicinity have _____ or will _____ the other _____.

e. Do not weld around _____ or _____ materials.

f. Do not pick up _____ metal.

g. Do not weld in confined places without proper _____.

h. Open the _____ _____ or disconnect the _____ when checking a welder.

i. Do not leave the _____ _____ on the welding table or in direct contact with grounded metal.

j. Do not use worn or frayed _____.

k. Stand on _____ footing when welding.

l. Keep areas around welder _____.

m. Keep _____ and _____ in their proper locations.

3. Name kinds of arc welders by unscrambling the names below.

a. G R A T E L A N N I T

_____ current

b. C I T D E R

_____ current

c. T R O O M

_____ generator

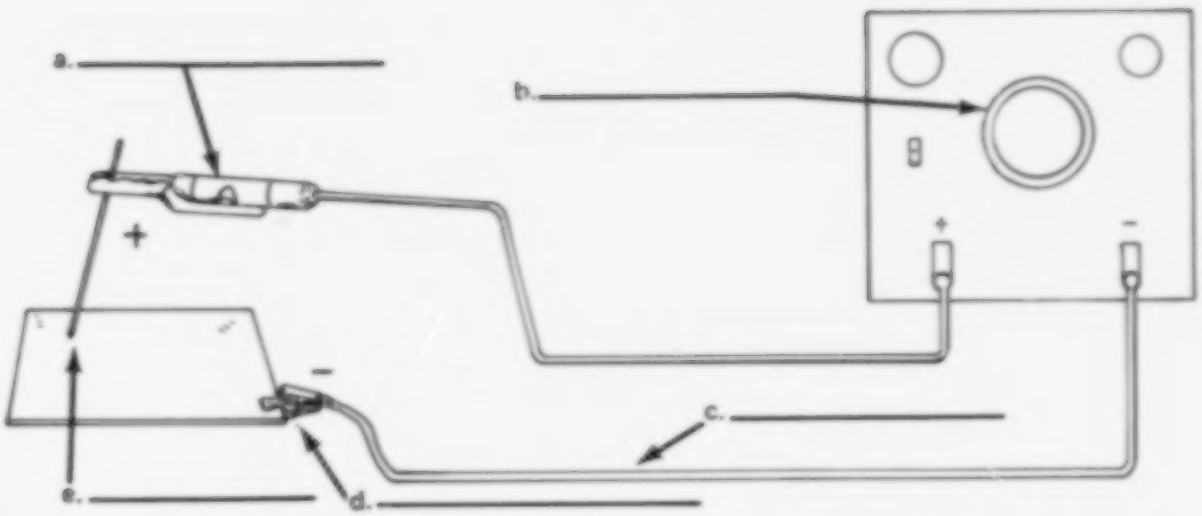
d. N E E I N G

_____ generator

e. F R O M A N T E R S - T R E E R I F I C

AC/DC _____ - _____

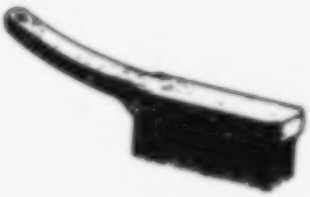
4. Identify the common welding equipment articles shown below.



f _____

h _____

g _____



i _____

j _____

5. Name the five types of electrodes by finding the words for the names in the word search below. Words go horizontally, vertically, and diagonally, either forward or backward.

S B U G H D L Y N
T U C A U F W O L
E I R M D L B L E
E D J F T R M L K
L G Q H A Y H A U
R B G C E C B S C
V I C N M M I L D
H Y D R O G E N X
A Z W P F D A O G

a. _____ _____

b. _____ _____ steel

c. _____ _____

d. _____ _____

e. _____

6. List the common sizes of electrodes by placing an "X" beside each of the common sizes in the list below.

_____a. 13/64" _____e. 5/32"

_____b. 1/8" _____f. 3/8"

_____c. 3/16" _____g. 3/32"

_____d. 9/32" _____h. 1/4"

7. Using the information given below, answer the questions asked about the electrode classification system.

a. "E" stands for electric arc welding.

b. First two digits indicate the tensile strength deposited in thousand pounds per square inch.

c. In the third digit,

"1" indicates that the electrode is suitable for all welding positions.

"2" indicates flat and horizontal positions only.

"3" indicates flat position only.

d. The last digits shows special characteristics and usability of the electrode as shown in the following chart.

Last Digit	Last-Digit Characteristics			
	Power Supply	Arc Action	Type of Flux	Penetration Characteristics
0	10, DC+; 20, AC; or DC	Digging	10, organic; 20, mineral	10, deep 20, medium
1	AC or DC+	Digging	Organic	Deep
2	AC or DC	Medium	Ductile	Medium
3	AC or DC	Soft	Ductile	Light
4	AC or DC	Soft	Ductile	Light
5	DC+	Medium	Low hydrogen	Medium
6	AC or DC+	Medium	Low hydrogen	Medium
7	AC or DC	Soft	Mineral	Medium
8	AC or DC+	Medium	Low hydrogen	Medium

(Reprinted by permission from T. B. Jefferson, The Welding Encyclopedia, p. E-4, Monticello Books, Morton Grove, Illinois, 1968.)

(1) In what positions can an E7024 electrode be used?_____

(2) Can an E7014 electrode be used with an AC welder?_____

(3) What tensile strength is deposited in thousandths of pounds per square inch using an E6027 electrode?_____

(4) What is the depth of penetration of an E6011 electrode?_____

(5) Can an E7027 electrode be used in an overhead position?_____

8. Name purposes of electrode coatings by completing the statements below.

a. __ __ __ __ __ __ __ __ the arc

b. Shield molten puddle from __ __ __

c. Float __ __ __ __ __ __ __ __ __ __ out of puddle

d. Form __ __ __ __ and slow __ __ __ __ __ __ __

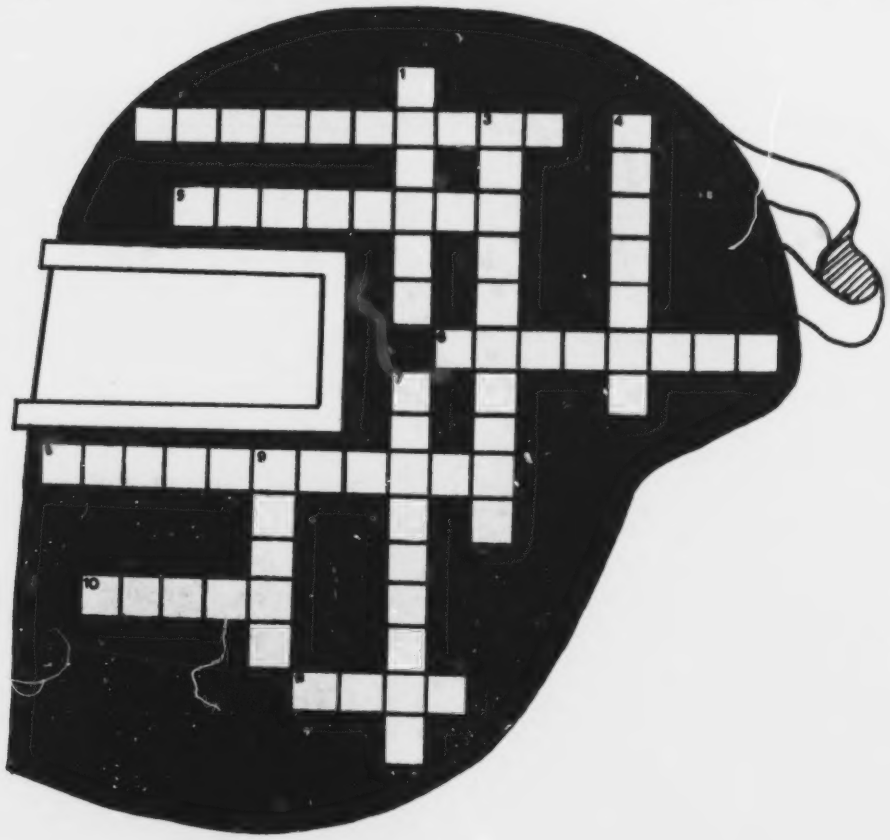
e. Increase __ __ __ __

f. Improve __ __ __ __ __ __ __ of weld

Check your answer by unscrambling the circled letters to form a word used in arc welding.

__ __ __ __ __ __ __ __ __

9. List factors to consider in selecting electrodes by working the crossword puzzle below.



a. Base metal __(6 Across)__ properties

b. __(11 Across)__ metal __(8 Across)__

c. Welding __(5 Across)__

d. Welding __(4 Down)__

e. Joinet __(1 Down)__ and __(10 Across)__

f. __(7 Down)__ and __(9 Down)__ of base metal

g. Production __(2 Across)__ and job __(3 Down)__

10. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below which require additional study.

Refer to Information Sheet, Sections:

_____I	_____VI
_____II	_____VII
_____III	_____VIII
_____IV	_____IX
_____V	

If none of the above areas is checked, proceed to LAP Step 7. Otherwise, study the required sections and continue to LAP Step 6.

ORIENTATION AND SAFETY
UNIT IV

LAP ASSIGNMENT SHEET #2--ARC WELDING PRINCIPLES

NAME_____ SCORE_____

1. Define the following terms.

a. Arc -- _____

_____

b. Arc welding -- _____

_____

c. AWS -- _____

_____

d. Base metal -- _____

_____

e. Bead weld -- _____

_____

f. Bevel -- _____

_____

g. Butt joint -- _____

_____

h. Crater -- _____

_____

i. Electrode -- _____

_____

j. Fusion process -- _____

_____

k. Pass -- _____

_____

l. Puddle -- _____

_____

m. Tack weld -- _____

_____

2. List 10 safety precautions used in arc welding.

a.

b.

c.

d.

e.

f.

g.

h.

i.

j.

3. List five kinds of arc welders.

a.

b.

c.

d.

e.

4. Name nine articles of common welding equipment.

a.

b.

c.

d.

e.

f.

g.

h.

i.

5. Name five types of electrodes.

a.

b.

c.

d.

e.

6. List the four most common sizes of electrodes.

a.

b.

c.

d.

7. Explain what each of the digits in the electrode classification system generally represents in the example below.

a. E--

b. 70 (first two digits)--

c. 1-- (third digit)--

d. 7 (last digit)--

8. Explain the purposes of electrode coating.

9. List seven factors to consider in selecting electrodes.

   a.

   b.

   c.

   d.

   e.

   f.

   g.

10. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 7. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 7.

ORIENTATION AND SAFETY
UNIT IV

LAP ASSIGNMENT SHEET #3--THE ARC

NAME_____ SCORE_____

1. Describe the effects of raising and lowering arc welding current by drawing a line through the incorrect choice in each statement.

   a. Raising the current produces more/less heat.

   b. Lowering the current produces more/less heat.

2. List methods of striking an arc by placing an "X" in the blank beside each correct method listed below.

   _____a. Grinding

   _____b. Tapping

   _____c. Igniting

   _____d. Blowing

   _____e. Scratching

3. List characteristics of proper arc length by placing an "X" in the blank beside each correct characteristic listed below.

   _____a. There is a "frying" sound at the arc.

   _____b. There is a "boiling" sound at the arc.

   _____c. The welder makes an alternating soft and loud hum.

   _____d. The welder makes a steady hum.

   _____e. The end of the electrode is approximately one-half the diameter of the electrode from the end of the electrode from the base metal.

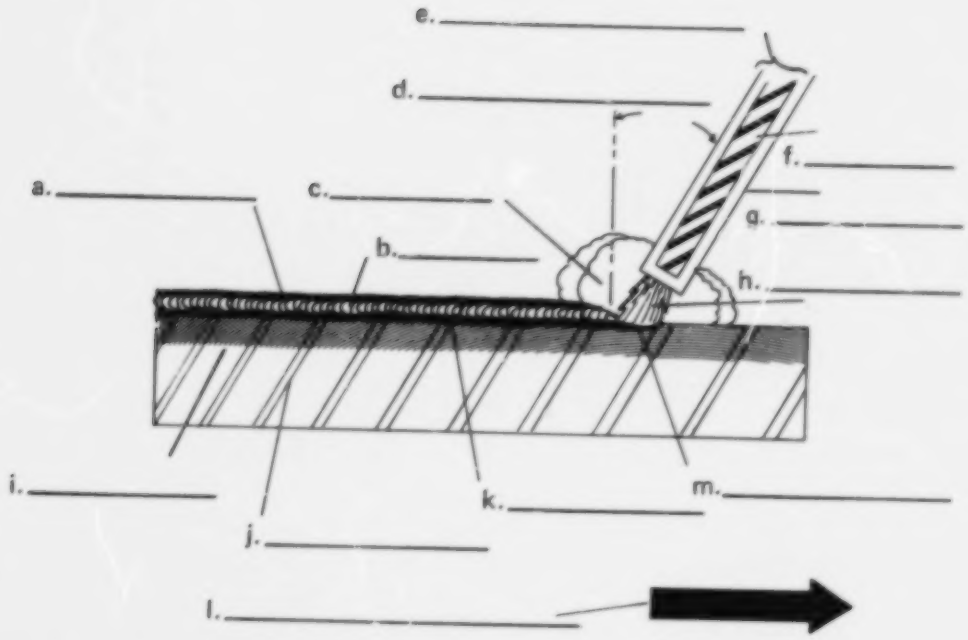
   _____f. The end of the electrode is the same distance from the base metal as the diameter of the electrode.

4. Identify the parts of the welding process by selecting terms from the list below and writing them in the correct blanks in the illustration.

Electrode	Arc
Wire core	15°-30° angle of electrode
Coating (flux)	Crater
Direction of travel	Gaseous shield

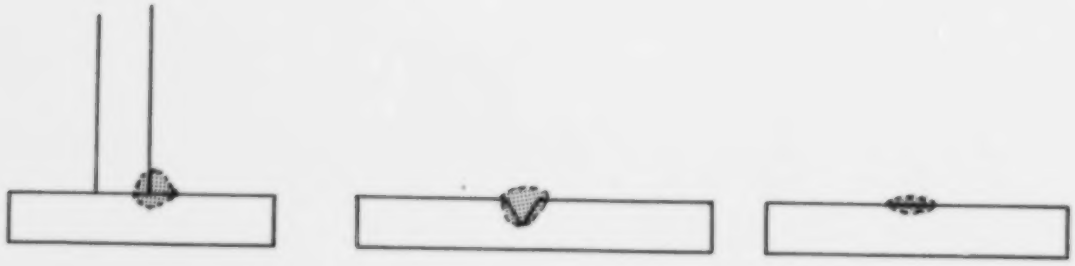
Heat lines
Weld
Slag

Base metal
Penetration



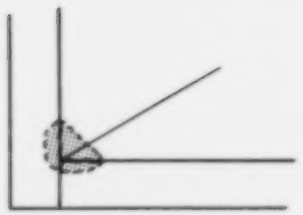
5. Identify kinds of welds by drawing a line from each term listed below to the correct illustration.

Bead Fillet Groove

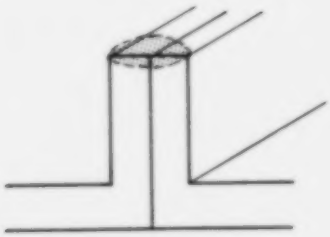


6. Identify weld joints by selecting terms from the list below and writing them in the correct blanks in the illustration.

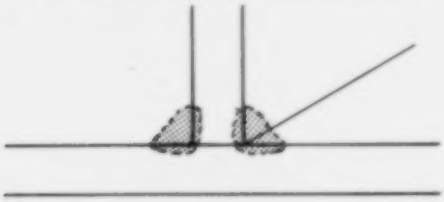
Edge
Butt
Lap
T
Corner



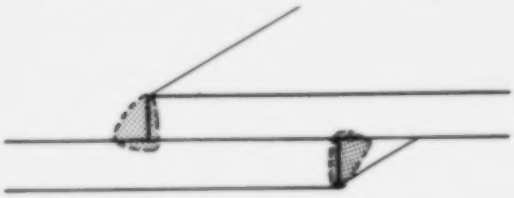
a. _____



b. _____



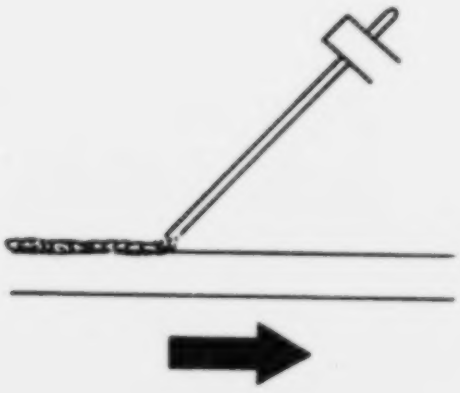
c. _____



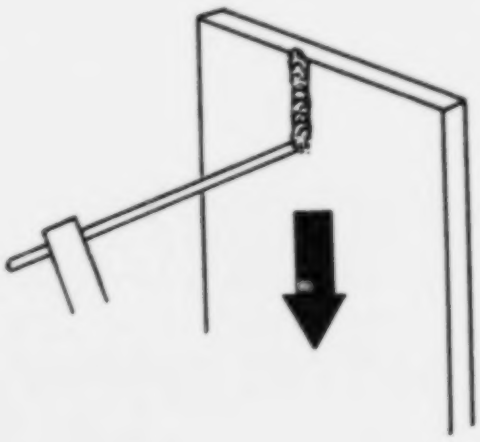
d. _____

e. _____

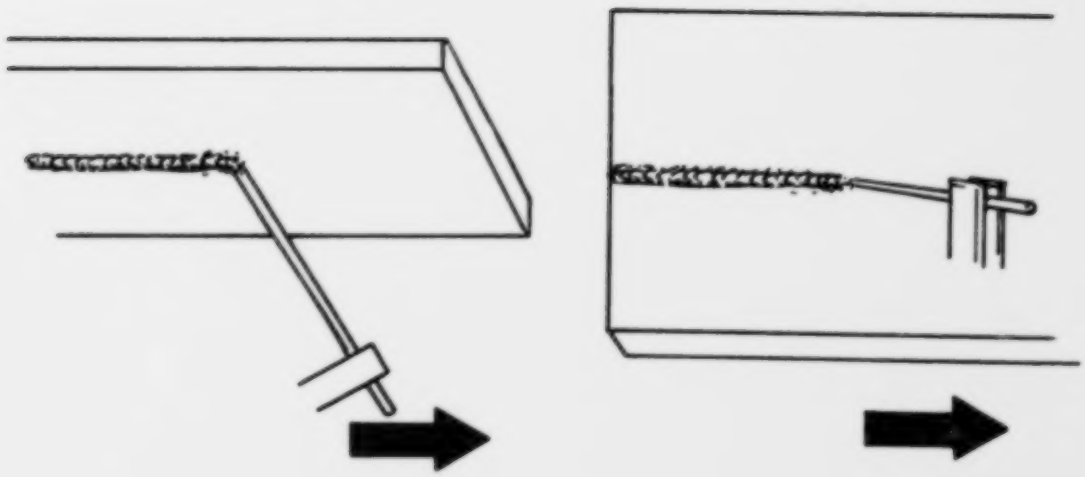
7. Identify the four welding positions by writing the correct term in the blank provided with each illustration below.



a. _____

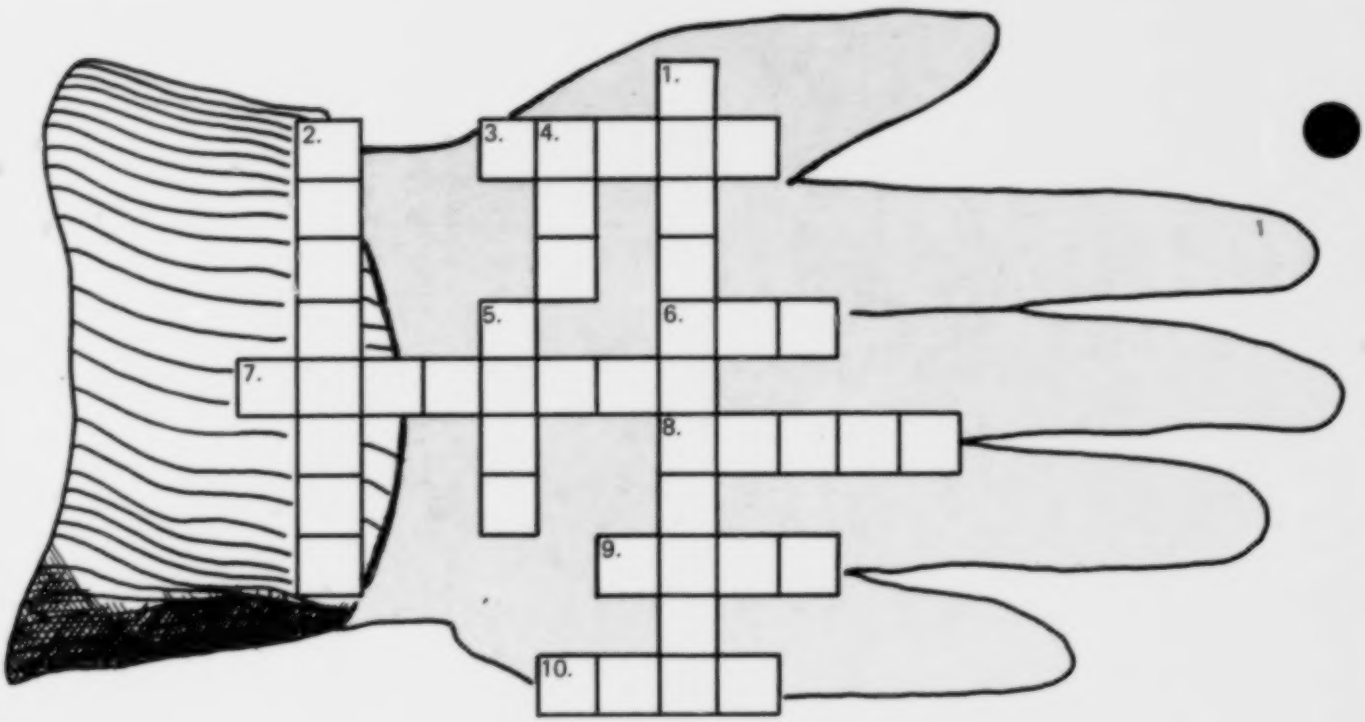


b. _____



c. _____ d. _____

8. Give reasons for poor welds by working the crossword puzzle below.



a. Machine adjustment too (4 Down) or too (5 Down).

b. Electrode (9 Across) too large or too small.

c. Improper (2 Down) of electrode.

d. Improper (8 Across) of electrode.

e. (7 Across) base metal (1 Down).

f. (6 Across) length too (10 Across) or too (3 Across).

9. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below which require additional study.

Refer to Information Sheet, Sections:

_____X	_____XIV
_____XI	_____XV
_____XII	_____XVI
_____XIII	_____XVII

If none of the above study areas is checked, proceed to LAP Step 10. Otherwise, study the required sections and then continue to LAP Step 9.

ORIENTATION AND SAFETY
UNIT IV

LAP ASSIGNMENT SHEET #4--THE ARC

NAME_____ SCORE_____

1. Describe the effects of raising and lowering arc welding current.

2. Name two methods of striking an arc.

   a.

   b.

3. Describe characteristics of proper arc length by explaining how each of the words or phrases below applies to proper arc length.

   a. Diameter of electrode -- _____

   _____

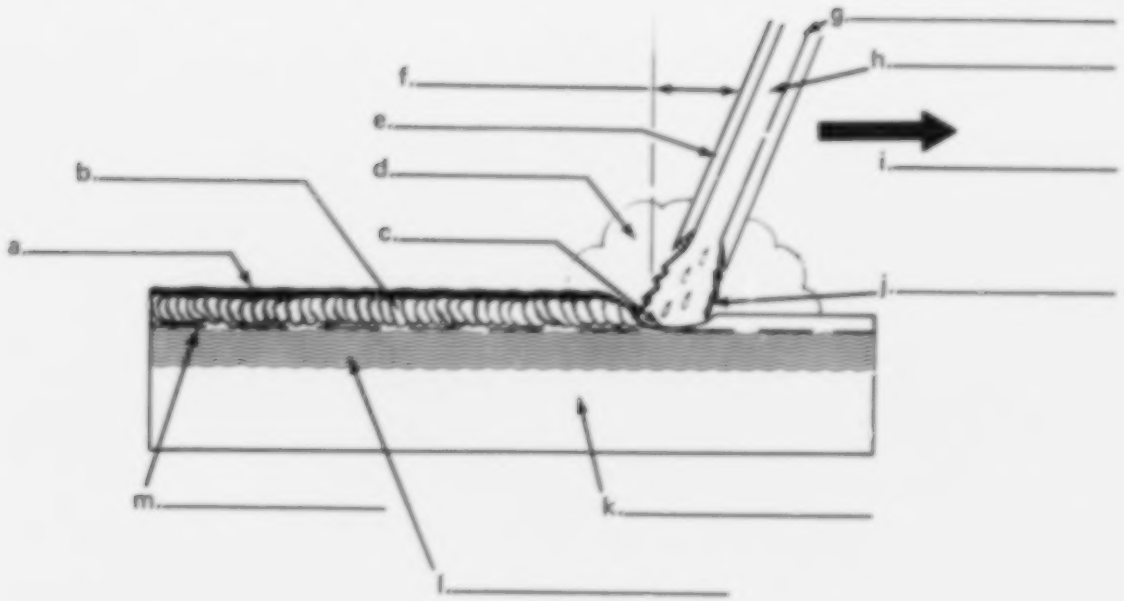
   b. Sound of welder -- _____

   _____

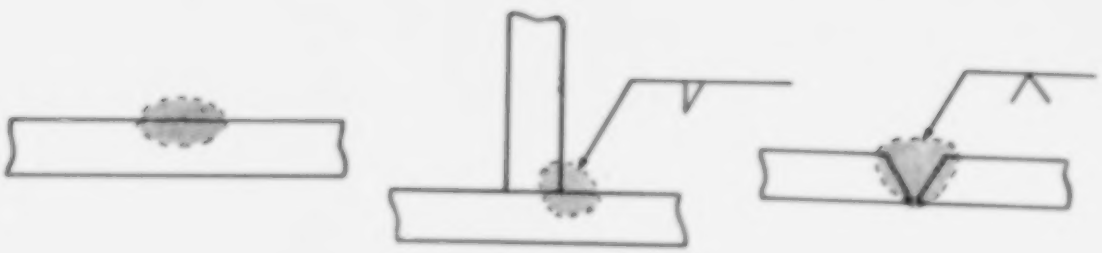
   c. Sound of arc -- _____

   _____

4. Label the parts of the welding process in the drawing below by writing the correct names in the blanks.

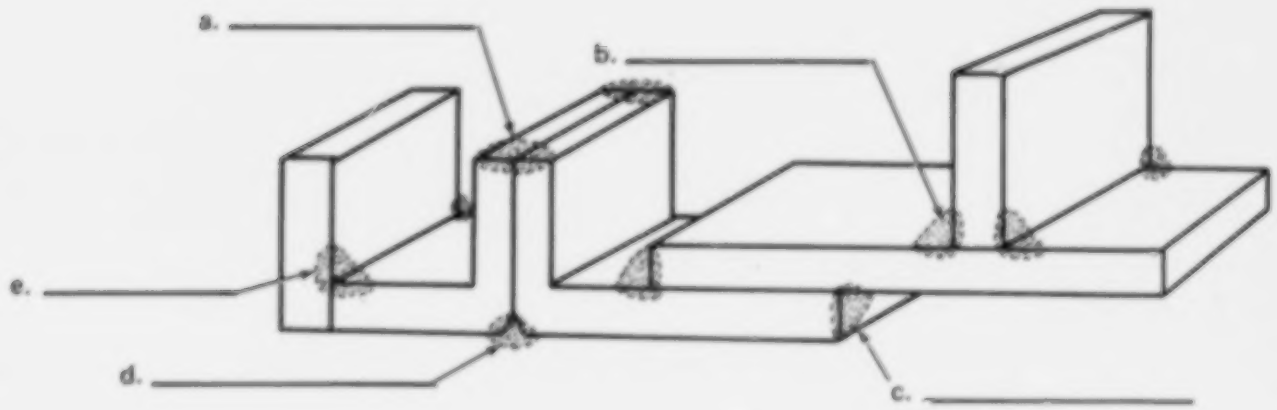


5. Identify the following welds.



a. _____ b. _____ c. _____

6. Identify weld joints by writing the names of the joint that should be used in each location shown.



7. Name the four welding positions.

   a.

   b.

   c.

   d.

8. List six reasons for poor welds.

   a.

   b.

   c.

   d.

   e.

   f.

9. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 10. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 10.

State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO. _____ CODE: _____

MAJOR INSTRUCTIONAL AREA

ORIENTATION AND SAFETY

INSTRUCTIONAL UNIT

OXYACETYLENE CUTTING
SECTION A--UNIT V

LEARNING ACTIVITY PACKET NO.

5

PREREQUISITE LAP(S)

1, 2

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities and performance tasks for "Oxyacetylene Cutting." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training and in achieving a skilled or Moderately Skilled competency level in the performance of jobs associated with this specialty.

INTRODUCTION: The course of study in this LAP will help the student become able to operate an oxyacetylene cutting outfit safely and make basic cuts.

TASKS INCLUDED IN THIS LAP:

1. Set up equipment for oxyacetylene cutting.
2. Turn on, light, adjust to a neutral flame, and turn off oxyacetylene cutting equipment.
3. Make ninety-degree cuts on mild steel and restart a cut.
4. Cut round stock.

AUTO MECHANICS I
OXYACETYLENE CUTTING

SECTION A--UNIT V

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps

_____1. Read Unit and Specific Objectives, page 219-A.

_____2. Complete Oxyacetylene Cutting Pre-Test, LAP page 5.

_____3. Study The Sections of the Information Sheet, pages 223-A through 229-A, indicated on your Pre-Test. Be sure to study the Transparency Masters when required.

_____4. Do LAP Assignment Sheet #1, LAP page 13.

_____5. Do LAP Assignment Sheet #2, LAP page 19.

_____6. Check The tasks below which you feel that you can perform without supervision.

Student Check		Instructor Initials/Date	
		Skilled	Moderately Skilled
_____a.	Set up equipment for oxyacetylene cutting (9).	_____	_____
_____b.	Turn on, light, adjust to a neutral flame, and turnoff oxyacetylene cutting equipment (15).	_____	_____
_____c.	Make ninety degree cuts on mild steel and restart a cut (21).	_____	_____
_____d.	Cut round stock (27).	_____	_____

_____7. Discuss Your competency in each task with your instructor. Your instructor will initial each task in which you demonstrate sufficient competency. If all tasks have been initialed, proceed to Step 32. Otherwise, continue to Step 8.

_____8. Refer To Step 6a. If this task has been initialed, proceed to Step 14. Otherwise, continue to Step 9.

_____9. Study Job Sheet #1--Set Up Equipment for Oxyacetylene Cutting, page 237-A.

_____10. Watch Slide/tape presentation "Set Up Equipment for Oxyacetylene Cutting" (Welding Curriculum, D-I-1).

_____11. Do Job Sheet #1--Set Up Equipment for Oxyacetylene Cutting.

_____12. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6a, and proceed to Step 14. Otherwise, repeat Steps 9-11 and then go to Step 13.

_____13. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6a and continue to Step 14. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 6a and continue to Step 14.

_____14. Refer To Step 6b. If this task has been initialed, proceed to Step 20. Otherwise, continue to Step 15.

_____15. Study Job Sheet #2--Turn On, Light, Adjust, and Turn Off the Cutting Torch, page 239-A.

_____16. Watch — Slide/tape presentation "Turn On, Light, and Adjust the Cutting Torch to a Neutral Flame and Turn Off Oxyacetylene Cutting Equipment" (Welding Curriculum D-I-2).

_____17. Do — Job Sheet #2--Turn On, Light, Adjust, and Turn Off the Cutting Torch.

_____18. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6b and proceed to Step 20. Otherwise, repeat Steps 15-17 and then go to Step 19.

_____19. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6b and continue to Step 20. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 6b and continue to Step 20.

_____20. Refer — To Step 6c. If this task has been initialed, proceed to Step 26. Otherwise, continue to Step 21.

_____21. Study — Job Sheet #3--Make Ninety-Degree Cuts on Mild Steel and Restart a Cut, page 241-A.

_____22. Watch — Slide/tape presentation "Make Ninety-Degree Cuts on Mild Steel and Restart a Cut" (Welding Curriculum D-I-4).

_____23. Do — Job Sheet #3--Make Ninety-Degree Cuts on Mild Steel and Restart a Cut.

_____24. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6c and proceed to Step 26. Otherwise, repeat Steps 21-23 and then go to Step 25.

_____25. Stop — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6c and continue to Step 26. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 6c and continue to Step 26.

_____26. Refer — To Step 6d. If this task has been initialed, proceed to Step 31. Otherwise, continue to Step 27.

_____27. Study — Job Sheet #4--Cut Round Stock, page 243-A.

_____28. Do — Job Sheet #4--Cut Round Stock.

_____29. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6d and proceed to Step 31. Otherwise, repeat Steps 27 and 28 and then go to Step 30.

_____30. Stop. — Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6d and continue to Step 31. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 6d and continue to Step 31.

_____31. Refer — To Step 6. If all tasks have been initialed, continue to Step 32. Otherwise, refer to the step indicated in parentheses after the unsigned task.

_____32. Review — Information Sheet (page 223-A) and Assignment Sheets.

_____33. Take — Oxyacetylene Cutting Unit V Test (see your instructor). If your score is 85 percent or more, continue to the next assigned Learning Activity Packet. Otherwise, ask your instructor about additional study requirements and possible re-testing.

OXYACETYLENE CUTTING
UNIT V

PRE-TEST

NAME_____ SCORE_____

DIRECTIONS: This test is to determine how much you already know about oxyacetylene cutting. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you are certain of the answer. Guessing may prevent you from receiving the lessons which are required.

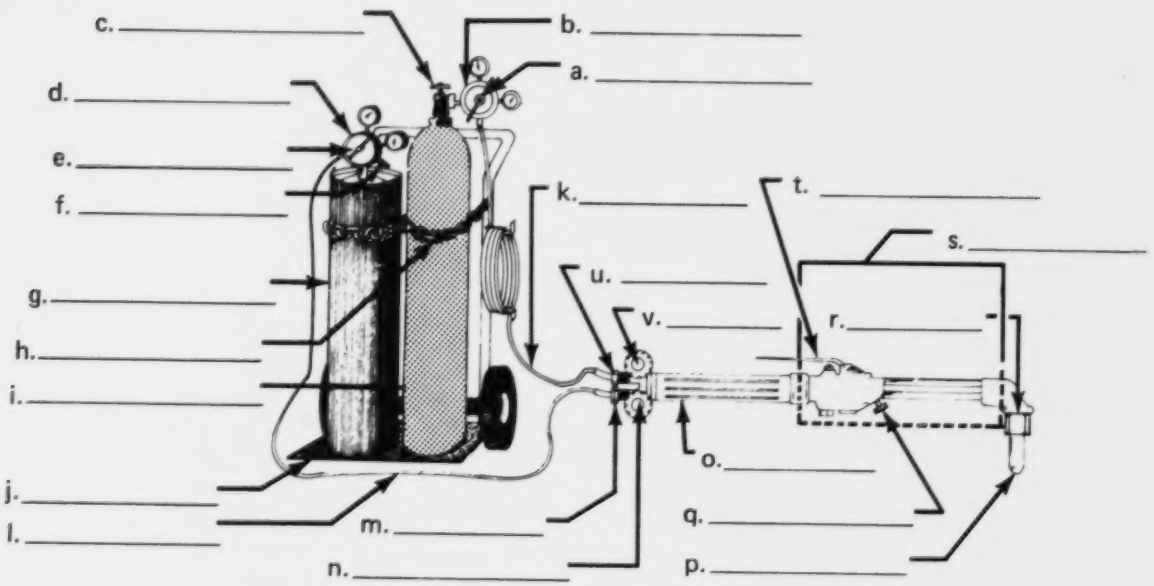
1. Match the terms on the right to the correct definitions. Definitions continue on next page.

_____a.	Fire inside of the torch	1. Slag box
_____b.	The rust formed on the tip of the torch	2. Oxidizing
_____c.	Momentary burning back of the flame inside the tip	3. Flashback
_____d.	Process by which iron or steel is heated to a temperature where it can be rapidly oxidized by high purity oxygen flowing under pressure through a cutting torch	4. Dragline 5. Oxide 6. Backfire
_____e.	A small explosion caused by oxygen being trapped in the line	7. Kerf 8. Purge
_____f.	Metal container with a layer of water or sand to catch hot slag	9. Flame cutting
_____g.	Situation in which the most distant portion of the cutting stream lags behind the stream nearest the cutting tip	
_____h.	Combining oxygen with another substance	
_____i.	To cut in short, smooth strokes	
_____j.	Substance that is produced when oxygen is combined with an element	
_____k.	Area of material removed from a piece of metal by a saw or cutting torch	

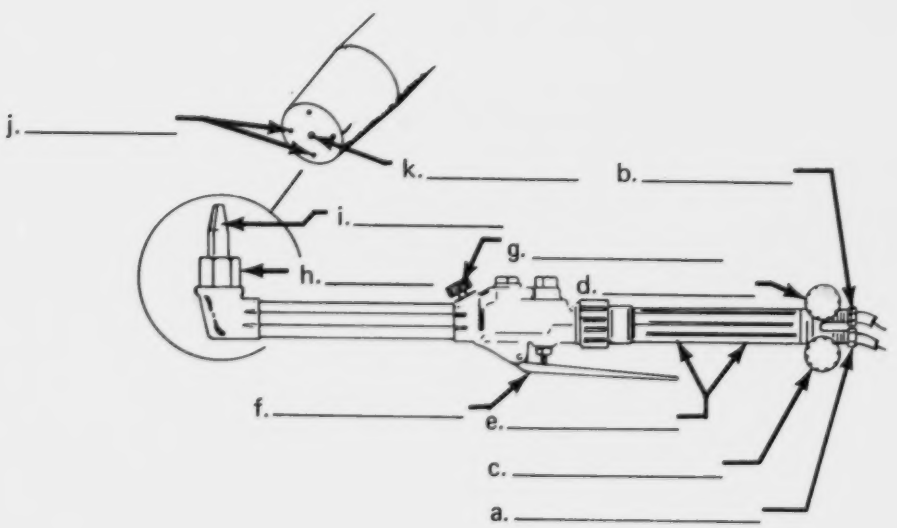
_____l. A safety line used to secure cylinders of explosive gas

_____m. To remove any foreign material from a system or component by flushing with the gas used in that system

2. Identify the parts of the oxyacetylene cutting outfit in the diagram below by writing the correct names in the blanks.



3. Identify the parts of the torch body and cutting attachment in the diagram below.



4. List rules for the safe handling of oxygen and acetylene equipment by explaining how the following words or phrases apply to handling oxygen and acetylene equipment.

a. Securing cylinders -- _____

_____

b. Purging cylinder valve -- _____

_____

c. Regulator adjusting screws -- _____

_____

d. Opening the cylinder valve -- _____

_____

e. Maximum acetylene pressure -- _____

_____

f. Purging oxygen and acetylene passages -- _____

_____

g. Opening oxygen valve on torch -- _____

_____

h. Use of oil on oxyacetylene equipment -- _____

_____

i. Using oxygen as compressed air -- _____

_____

j. Combustible materials -- _____

_____

k. Protective clothing -- _____

_____

l. Testing for leaks -- _____

_____

m. Containers that have contained combustible materials -- _____

_____

n. Toxic fumes -- _____

_____

o. Leaving a burning torch unattended -- _____

_____

p. Concrete -- _____

_____

q. Ventilation -- _____

_____

r. Distance from cylinders -- _____

_____

s. Protection of hoses -- _____

_____

5. Describe the oxygen-acetylene mixture in the three flames shown.

a. _____

b. _____

c. _____

6. List the most likely causes of the poor cuts illustrated below.

(NOTE: Bottom of cut exhibits bad gouging.)

a._____

(NOTE: The top surface has melted over, the cut edge is irregular, and there is an excessive amount of adhering slag.)

b._____

(NOTE: The top edge has melted over.)

c._____

d._____

e._____

(NOTE: Bad gouges occur at restarting points.)

f._____

g._____

h. _____

7. List five causes of backfire.

a. _____

b. _____

c. _____

d. _____

e. _____

8. Describe what happens when a backfire occurs.

9. Describe what happens when a flashback occurs.

10. List in the proper sequence the steps to follow in case of a flashback.

11. Stop. Have your instructor evaluate your Pre-Test and mark the areas below which require additional study.

Refer to Information Sheet, Sections:

_____I	_____VI
_____II	_____VII
_____III	_____VIII
_____IV	_____IX
_____V	_____X

You came here from LAP Step 2. If any of the above study areas is checked, continue to LAP Step 3. Otherwise, proceed to LAP Step 6.

ORIENTATION AND SAFETY
UNIT V

LAP ASSIGNMENT SHEET #1--OXYACETYLENE CUTTING

NAME_____ SCORE_____

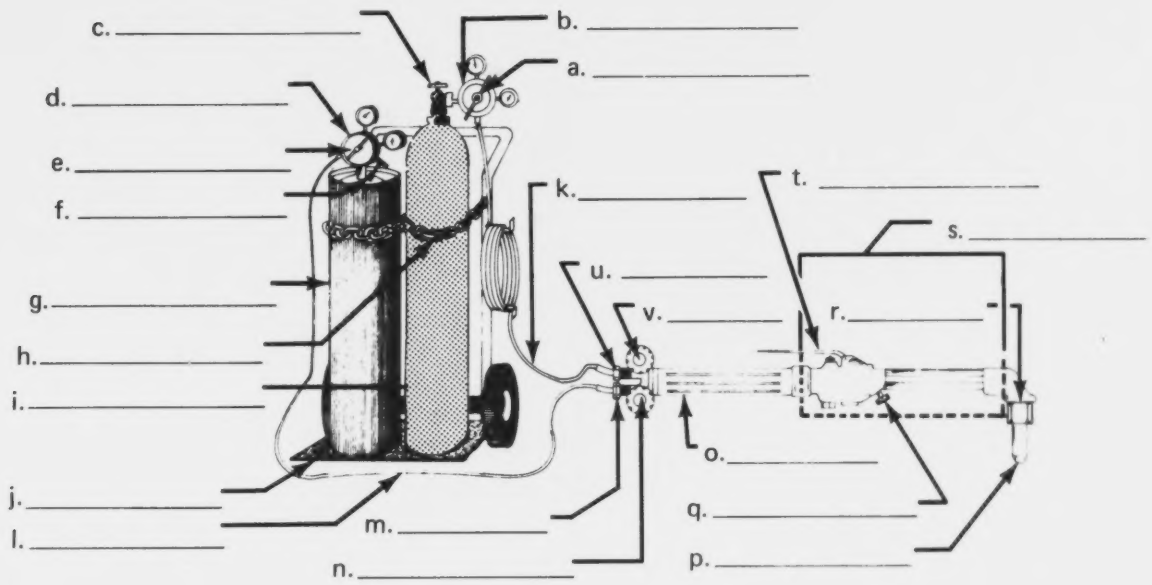
1. Match the terms on the right to the correct definitions.

_____a.	Fire inside of the torch	1. Flashback
_____b.	Momentary burning back of the flame into the tip	2. Kerf
_____c.	Process by which iron or steel is heated to a temperature where it can be rapidly oxidized by high purity oxygen flowing under pressure through a cutting torch	3. Slag box
_____d.	Metal container with a layer of water or sand to catch hot slag	4. Oxide
_____e.	Situation in which the most distant portion of the cutting stream lags behind the stream nearest the cutting tip	5. Flame cutting
_____f.	Combining oxygen with another substance	6. Backfire
_____g.	Substance that is produced when oxygen is combined with an element	7. Oxidizing
_____h.	Area of material removed from a piece of metal by a saw or cutting torch	8. Purge
_____i.	To remove any foreign material from a system or component by flushing with the gas used in that system	9. Dragline

2. Identify the parts of the oxyacetylene cutting outfit in the diagram on the next page by selecting terms from the following list and writing them in the correct blanks.

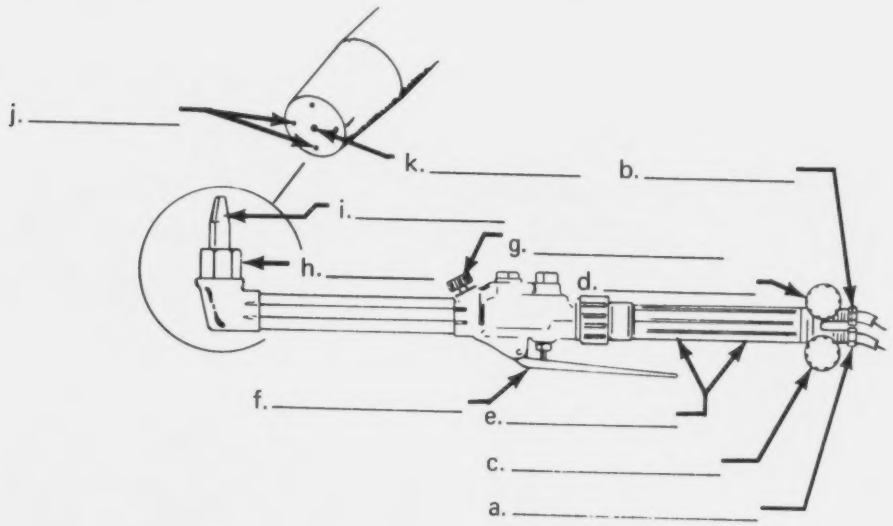
Tip nut	Acetylene pressure regulating screw
Oxygen pressure regulating screw	Acetylene torch valve
Oxygen preheat valve	Acetylene cylinder valve
Oxygen regulator	Acetylene fitting
Tip	Acetylene cylinder
Oxygen cylinder valve	Safety chain
Torch body	Acetylene hose
Acetylene regulator	Oxygen cylinder
Oxygen hose	Cutting attachment

Cylinder truck
Oxygen cutting lever
Oxygen torch valve
Oxygen fitting



3. Identify the parts of the torch body and cutting attachment in the diagram below by selecting the correct terms from the following list.

Cutting orifice
Preheat orifice
Oxygen torch valve
Torch body
Tip
Oxygen cutting lever
Oxygen fitting
Acetylene fitting
Acetylene torch valve
Tip nut
Oxygen preheat valve



4. List rules for the safe handling of oxygen and acetylene equipment by completing the following statements.

   a. Secure cylinders to prevent damage to _____ or _____.

   b. Purge cylinder valve before attaching _____.

   c. Release _____ _____ on regulator before opening cylinder valve.

   d. Stand to one side of _____ while _____ opening the cylinder valve.

   e. Do not use acetylene at pressures of _____ psi.

   f. Purge oxygen and acetylene _____ before lighting torch.

   g. Light _____ gas before opening _____ valve on torch.

   h. Do not use _____ on regulators, torches, fittings, or any place that it may come in contact with _____.

   i. Do not use oxygen as a substitute for _____ _____.

   j. Keep heat, flames, and sparks away from _____.

   k. Use safety goggles, gloves, and _____ _____.

   l. Test connections for leaks with _____ _____ and a paint brush.

   m. Do not weld on containers that have been used for _____ _____.

   n. Avoid breathing _____ _____ when welding.

   o. Do not leave a burning torch _____.

   p. Do not cut or weld near _____.

   q. Operate torch in a _____-_____ area.

   r. Weld or cut at least _____ feet from cylinders.

   s. Protect hoses from _____ metal, _____, or _____ _____.

5. Identify the three types of oxyacetylene cutting flames illustrated below.

Oxidizing flame Neutral flame Carburizing flame

a. _____

b. _____

c. _____

6. Give reasons for a poor cut by placing an "X" in the blank beside each condition which could cause a poor cut.

_____a. Oxygen pressure too low

_____b. Acetylene pressure too low

_____c. Cable improperly grounded

_____d. Preheat flames too small

_____e. Cutting speed too slow

_____f. Cut lost and not carefully restarted

_____g. Acetylene excessively aged

_____h. Cutting speed too slow

_____i. Electric current improperly adjusted

_____j. Oxygen pressure too high; nozzle size too small

_____k. Preheat flames too long

_____l. Too much draft across tip

_____m. Blowpipe travel unsteady

7. List causes for backfire by completing the following statements.

a. Insufficient acetylene or oxygen _____.

b. _____ cutting tip.

c. Loose _____ _____.

d. _____ of cutting tip.

e. Bad _____ _____ in torch body.

8-9. Distinguish between the following descriptions of backfire and flashback by putting a "B" in the blank beside the characteristics of backfire and an "F" in the blank beside the characteristics of flashback.

_____a. Flame disappears inside the torch body.

_____b. Flame either goes out or continues to burn in normal manner.

_____c. A loud snap or pop is emitted from the torch.

_____d. Squealing noise, smoke, and/or sparks are emitted from the torch tip.

_____e. Flame burns momentarily back into tip.

10. List in the proper order the steps to follow in case of a flashback by putting the correct number in the blank provided by each step.

_____a. Examine acetylene unit

_____b. Close acetylene torch valve

_____c. Light torch

_____d. Release oxygen regulator screw

_____e. Close oxygen preheat valve

_____f. Reset regulators

_____g. Release acetylene regulator screw

_____h. Close acetylene torch valve

11. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below which require additional study.

Refer to Information Sheet, Sections:

_____I	_____VI
_____II	_____VII
_____III	_____VIII
_____IV	_____IX
_____V	_____X

If none of the above areas is checked, proceed to LAP Step 6. Otherwise, study the required sections and continue to LAP Step 5.

ORIENTATION AND SAFETY
UNIT V

LAP ASSIGNMENT SHEET #2--OXYACETYLENE CUTTING

NAME_____ SCORE_____

1. Define the following terms.

a. Backfire -- _____

_____

b. Dragline -- _____

_____

c. Flame cutting -- _____

_____

d. Flashback -- _____

_____

e. Kerf -- _____

_____

f. Oxide -- _____

_____

g. Oxidizing -- _____

_____

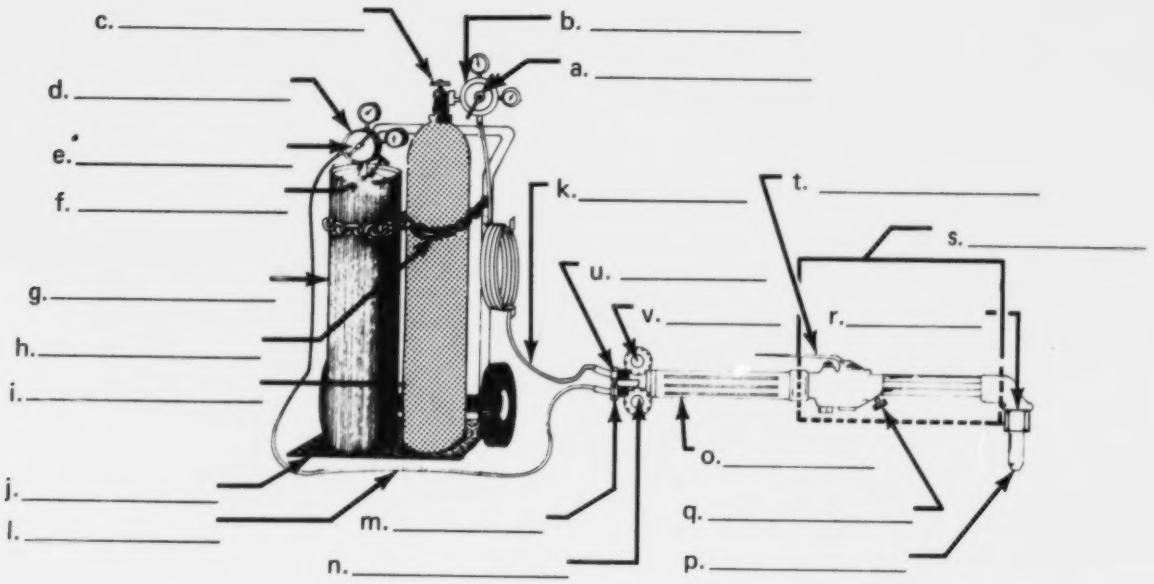
h. Purge -- _____

_____

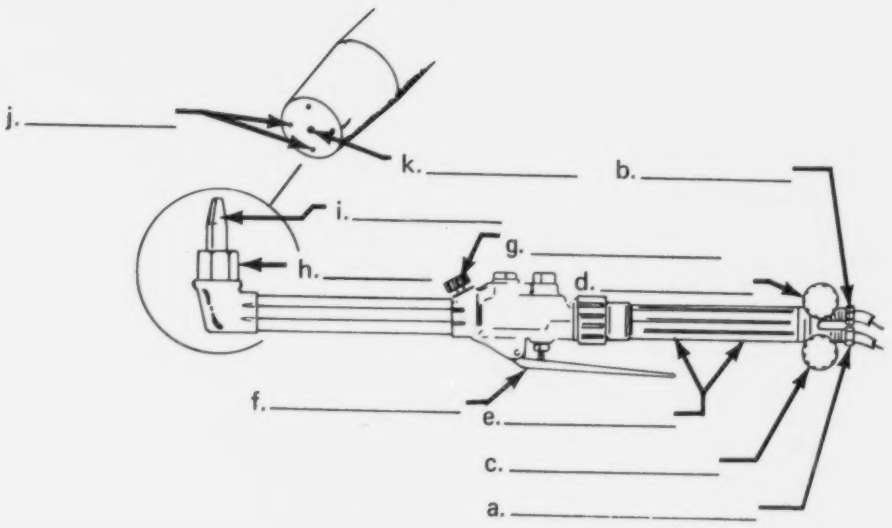
i. Slag box -- _____

_____

2. Identify the parts of the oxyacetylene cutting outfit in the diagram below by writing the correct names in the blanks.



3. Identify the parts of the torch body and cutting attachment in the diagram below.



4. List ten rules for the safe handling of oxygen and acetylene equipment.

   a.

   b.

   c.

   d.

   e.

   f.

   g.

   h.

   i.

   j.

5. Identify the following three types of flames.

a. _____

b. _____

c. _____

6. List eight reasons for poor cuts.

   a.

   b.

   c.

   d.

   e.

   f.

   g.

   h.

7. List five causes of backfire.

   a.

   b.

   c.

   d.

   e.

8. Describe what happens when a backfire occurs.

9. Describe what happens when a flashback occurs.

10. List in the proper order the steps to follow in case of a flashback.

    a.

    b.

    c.

    d.

    e.

    f.

    g.

    h.

11. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 6. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 6.

State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO. _____ CODE: _____

MAJOR INSTRUCTIONAL AREA

ORIENTATION AND SAFETY

INSTRUCTIONAL UNIT

OXYACETYLENE FUSION WELDING
SECTION A--UNIT VI

LEARNING ACTIVITY PACKET NO.

6

PREREQUISITE LAP(S)

1, 2

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities and performance tasks for "Oxyactylene Fusion Welding." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training and in achieving a Skilled or Moderately Skilled competency level in the performance of jobs associated with this specialty.

INTRODUCTION: The course of study in this LAP will help the student become able to operate oxyacetylene welding equipment properly, select proper tip size and filler rod, and make welds with or without filler rod.

TASKS INCLUDED IN THIS LAP:

1. Turn on, light, adjust, and turn off the oxyacetylene welding equipment.
2. Construct a corner weld without filler rod.
3. Lay beads on gauge metal without filler rod.
4. Lay beads on gauge metal with filler rod.
5. Weld butt joints with filler rod.

AUTO MECHANICS I
OXYACETYLENE FUSION WELDING

SECTION A--UNIT VI

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps

_____1. Read Unit and Specific Objectives, page 255-A.

_____2. Complete Oxyacetylene Fusion Welding Pre-Test, LAP page 7.

_____3. Study The sections of the Information Sheet, pages 259-A through 261-A, indicated on your Pre-Test. Be sure to study Transparency Masters when required.

_____4. Watch Film "Oxyacetylene Welding Equipment."

_____5. Do LAP Assignment Sheet #1, LAP page 11.

_____6. Do LAP Assignment Sheet #2, LAP page 17.

_____7. Check The tasks below which you feel that you can perform without supervision.

Student Check		Instructor Initials/Date	
		Skilled	Moderately Skilled
_____a.	Turn on, light, adjust, and turn off oxyacetylene welding equipment (11).	_____	_____
_____b.	Construct a corner weld without a filler rod (17).	_____	_____
_____c.	Lay beads on gauge metal without filler rod (23).	_____	_____

_____d.	Lay beads on gauge metal with filler rod (29).	_____	_____	
_____e.	Weld butt joints with filler rod (35).	_____	_____	

_____8. Discuss Your competency in each task with your instructor. Your instructor will initial each task in which you demonstrate sufficient competency. If all tasks have been initialed, proceed to Step 41. Otherwise, continue to Step 9.

_____9. Watch Film "Oxyacetylene Welding: Torch Techniques."

_____10. Refer To Step 7a. If this task has been initialed, proceed to Step 16. Otherwise, continue to Step 11.

_____11. Study Job Sheet #1--Turn On, Light, Adjust, and Turn Off Oxyacetylene Welding Equipment, page 271-A.

_____12. Watch Slide/tape presentation "Turn On, Light, Adjust, and Turn Off Oxyacetylene Welding Equipment" (Welding Curriculum, D-II-2).

_____13. Do Job Sheet #1--Turn On, Light, Adjust, and Turn Off Oxyacetylene Welding Equipment.

_____14. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 7a and proceed to Step 16. Otherwise, repeat Steps 11-13 and then go to Step 15.

_____15. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 7a and continue to Step 16. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 7a and continue to Step 16.

_____16.	Refer	To Step 7b. If this task has been initialed, proceed to Step 22. Otherwise, continue to Step 17.
_____17.	Study	Job Sheet #2--Construct a Corner Weld Without a Filler Rod, page 273-A.
_____18.	Watch	Slide/tape presentation "Construct a Corner Weld Without a Filler Rod" (Welding Curriculum, D-II-3).
_____19.	Do	Job Sheet #3--Construct a Corner Weld Without a Filler Rod.
_____20.	Stop.	Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 7b and proceed to Step 22. Otherwise, repeat Steps 17-19 and then go to Step 21.
_____21.	Stop.	Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 7b and continue to Step 22. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 7b and continue to Step 22.
_____22.	Refer	To Step 7c. If this task has been initialed, proceed to Step 28. Otherwise, continue to Step 23.
_____23.	Study	Job Sheet #3--Lay Beads on Gauge Metal Without Filler Rod, page 275-A.
_____24.	Watch	Slide/tape presentation "Lay Beads on Gauge Metal Without Filler Rod" (Welding Curriculum, D-II-4).
_____25.	Do	Job Sheet #3--Lay Beads on Gauge Metal Without Filler Rod.

_____26. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 7c and proceed to Step 28. Otherwise, repeat Steps 23-25 and then go to Step 27.

_____27. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 7c and continue to Step 28. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 7c and continue to Step 28.

_____28. Refer To Step 7d. If this task has been initaled, proceed to Step 34. Otherwise, continue to Step 29.

_____29. Study Job Sheet #4--Lay Beads on Gauge Metal with Filler Rod, page 277-A.

_____30. Watch Slide/tape presentation "Lay Beads on Gauge Metal with Filler Rod" (Welding Curriculum, D-II-5).

_____31. Do Job Sheet #4--Lay Beads on Gauge Metal with Filler Rod.

_____32. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 7d and proceed to Step 34. Otherwise, repeat Steps 29-31 and then go to Step 33.

_____33. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 7d and continue to Step 34. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor inital Step 7d and continue to Step 34.

_____34. Refer To Step 7e. If this task has been initaled, proceed to Step 40. Otherwise, continue to Step 35.

_____35. Study Job Sheet #5--Weld Butt Joints with Filler Rod, page 279-A.

_____36. Watch Slide/tape presentation "Weld Butt Joints with Filler Rod" (Welding Curriculum, D-II-6).

_____37. Do Job Sheet #5--Weld Butt Joints with Filler Rod.

_____38. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 7e and proceed to Step 40. Otherwise, repeat Steps 35-37 and then go to Step 39.

_____39. Stop. Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial step 7e and continue to Step 40. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 7c and continue to Step 40.

_____40. Refer To Step 7. If all tasks have been initialed, continue to Step 41. Otherwise, refer to the step in parentheses after the unsigned task.

_____41. Review Information Sheet (page 259-A) and Assignment Sheets.

_____42. Take Oxyacetylene Fusion Welding Unit VI Test (see your instructor). If you score 85 percent or more, continue to the next assigned Learning Activity Packet. Otherwise, discuss additional study requirements and possible re-testing with your instructor.

OXYACETYLENE FUSION WELDING
UNIT VI

PRE-TEST

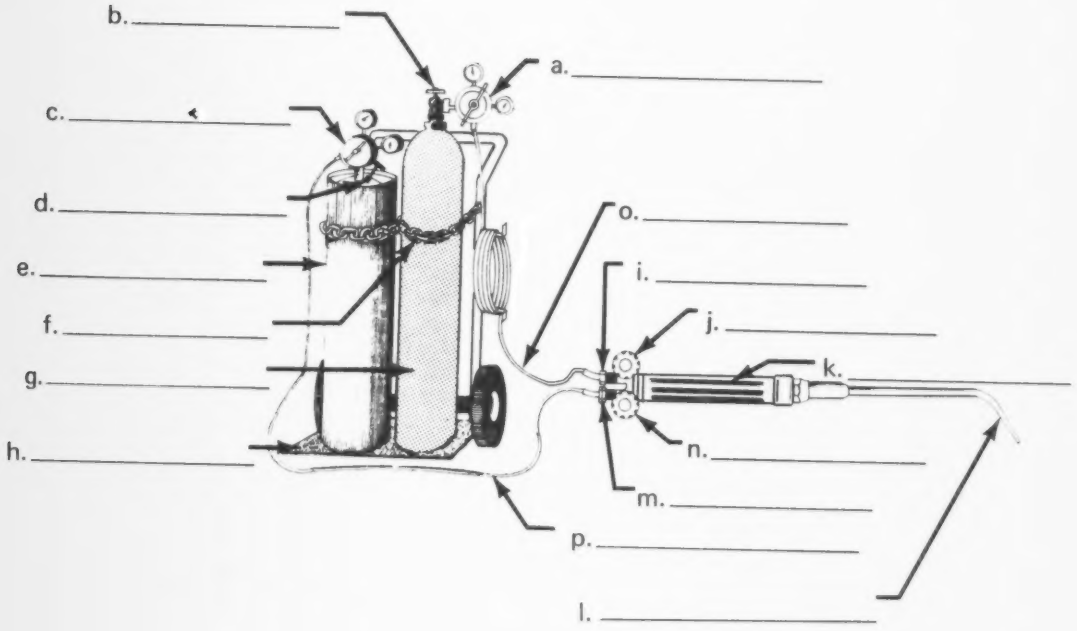
NAME_____ SCORE_____

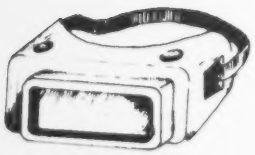
DIRECTIONS: This test is to determine how much you already know about oxyacetylene fusion welding. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you are certain of the answer. Guessing may prevent you from receiving the lessons which are required.

1. Match the terms on the right to the correct definitions.

_____a.	The angle between the torch and the bead	1. Tack weld
_____b.	Metal to be welded	2. Flashback
_____c.	Fire inside the torch; indicated by a hissing or squealing sound	3. Backfire
_____d.	Joining of pieces of metal by heating the adjoining edges to the fusion or melting point and allowing them to flow or run together and then cool	4. Inner cone 5. Alloy 6. Base metal
_____e.	To combine two metals moleculary by acid breakdown	7. Penetration 8. Fusion welding
_____f.	Inner white part of a neutral flame	
_____g.	Distance from the original surface of the base metal to that point at which fusion ceases	
_____h.	The cutting through a metal with heat buildup	
_____i.	Short weld used for temporarily holding metal in place	
_____j.	Mixture with metallic properties; com posed of two or more elements of which at least one is a metal	
_____k.	Momentary burning back of the flame into the tip; flame goes out with a loud snap or pop	

2. Identify the parts of the oxyacetylene fusion welding equipment illustrated below by writing the correct names in the blanks provided.





q. _____

r. _____

s. _____

3. List at least five factors that determine the quality of an oxyacetylene weld.

   a.

   b.

   c.

   d.

   e.

4. List the properties of a good weld by placing an "X" in the blank beside each property of a good weld listed below.

   _____a. Consistent width

   _____b. Flush with metal

   _____c. Straightness

   _____d. Thicker on underside of welded surface

   _____e. Darker at edges

   _____f. Slightly crowned

   _____g. Fused into base metal

   _____h. Clearly beaded at even spaces

   _____i. Clean appearance

5. List the two factors that determine the proper tip size for a particular job.

   a.

   b.

6. List the two factors that determine the proper filler rod to use for a particular job.

   a.

   b.

7. Describe the purpose of a filler rod.

8. Identify the three types of flames illustrated below by writing the correct names in the blanks.

a. _____

b. _____

c. _____

9. Stop. Have your instructor evaluate your Pre-Test and mark the areas below which require additional study.

Refer to the Information Sheet, Sections:

_____I	_____V
_____II	_____VI
_____III	_____VII
_____IV	_____VIII

You came here from LAP Step 2. If any of the above areas is checked, continue to LAP Step 3. Otherwise, proceed to LAP Step 7.

ORIENTATION AND SAFETY
UNIT VI

LAP ASSIGNMENT #1--OXYACETYLENE FUSION WELDING

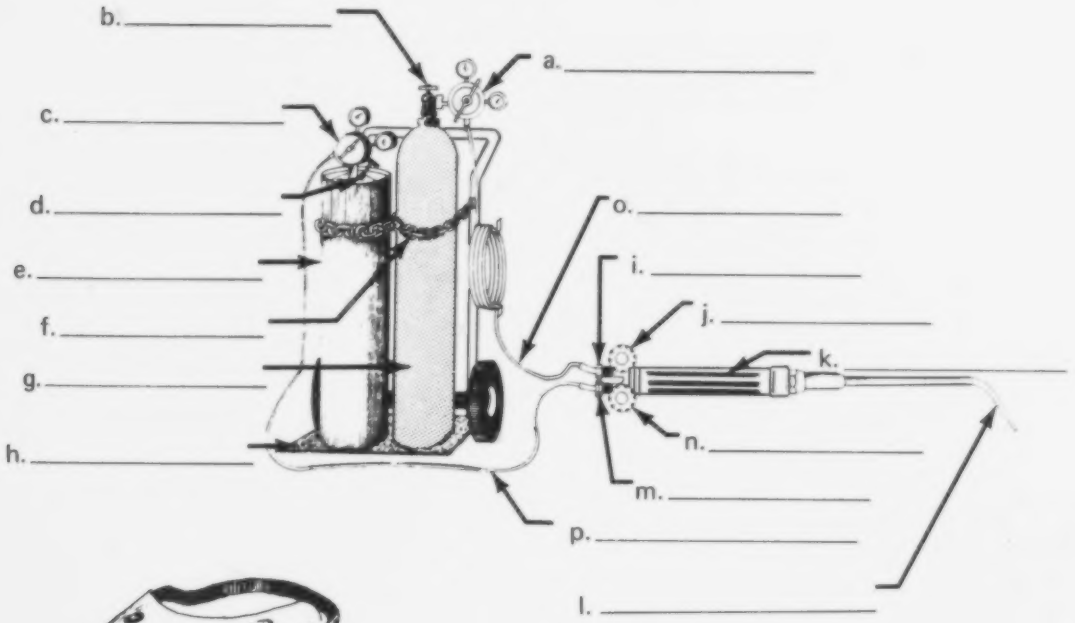
NAME_____ SCORE_____

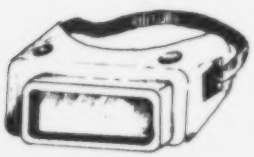
1. Match the terms at the right to the correct definitions.

_____a.	Metal to be welded	1.	Fusion welding
_____b.	Fire inside the torch; indicated by a hissing or squealing sound	2.	Tack weld
_____c.	Joining of pieces of metal by heating the adjoining edges to the fusion or melting point and allowing them to flow or run together and then cool	3.	Penetration
_____d.	Inner white part of a neutral flame	4.	Flashback
_____e.	Distance from the original surface of the base metal to that point at which fusion creases	5.	Base metal
_____f.	Short weld used for temporarily holding metal in place	6.	Backfire
_____g.	Mixture with metallic properties; composed of two or more elements of which at least one is a metal	7.	Alloy
_____h.	Momentary burning back of the flame into the tip; flame goes out with a loud snap or pop	8.	Inner cone

2. Identify the parts of the oxyacetylene fusion welding equipment illustrated below by selecting names from the following list and writing them in the correct blanks.

Welding gloves
Oxygen regulator
Welding goggles
Acetylene regulator
Oxygen hose
Acetylene cylinder
Acetylene fitting
Cylinder truck
Torch body
Oxygen fitting
Flint lighter
Oxygen cylinder valve
Acetylene hose
Acetylene cylinder valve
Acetylene torch valve
Safety chain
Welding tip
Oxygen torch valve
Oxygen cylinder



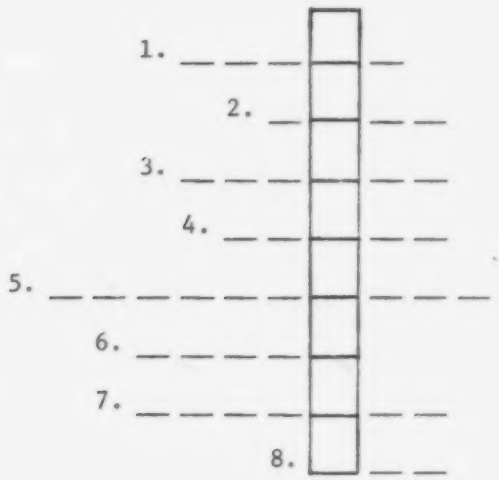


q. _____

r. _____

s. _____

3. List factors that determine weld quality by completing the statements below and using those answers to solve the puzzle.



a. Proper (one) (five)

b. (six) of (eight)

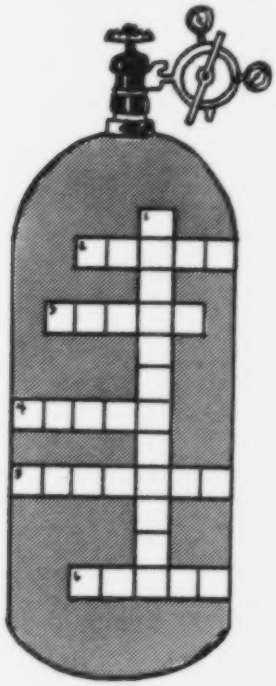
c. (seven) from (two)

d. (four) of (three)

e. _____ of tip

(The letters in the boxes should give you this answer.)

4. List the properties of a good weld by completing the crossword puzzle below.



a. Consistent (4 Across)

b. (1 Down)

c. Slightly (5 Across)

d. (6 Across) into the base (2 Across)

e. (3 Across) appearance

5. List factors that determine tip size by placing an "X" in the blank beside each correct factor below.

_____a. Thickness of metal

_____b. Size of welding rod

_____c. Kind of metal

_____d. Type of flame used

6. List factors that determine filler rod selection by placing an "X" in the blank beside each correct factor below.

   _____a. Time available for job

   _____b. Rod with similar properties as base metal

   _____c. Thickness of metal

   _____d. Welding position

7. Describe the purpose of a filler rod by completing the following statement.

   To add _____ to a weld of joint.

8. Identify these types of oxyacetylene welding flames by writing the correct name from the list below in the blanks provided.

   Neutral flame Carburizing flame Oxidizing flame

a._____

b._____

c._____

9. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below which require additional study.

   Refer to Information Sheet, Sections:

_____I	_____V
_____II	_____VI
_____III	_____VII
_____IV	_____VIII

   If none of the above areas is checked, proceed to LAP Step 7. Otherwise, study the required sections of the Information Sheet and then continue to LAP Step 6.

ORIENTATION AND SAFETY
UNIT VI

LAP ASSIGNMENT SHEET #2--OXYACETYLENE FUSION WELDING

NAME_____ SCORE_____

1. Define the following terms.

a. Base metal -- _____

_____

b. Backfire -- _____

_____

c. Alloy -- _____

_____

d. Fusion welding -- _____

_____

e. Inner cone -- _____

_____

f. Flashback -- _____

_____

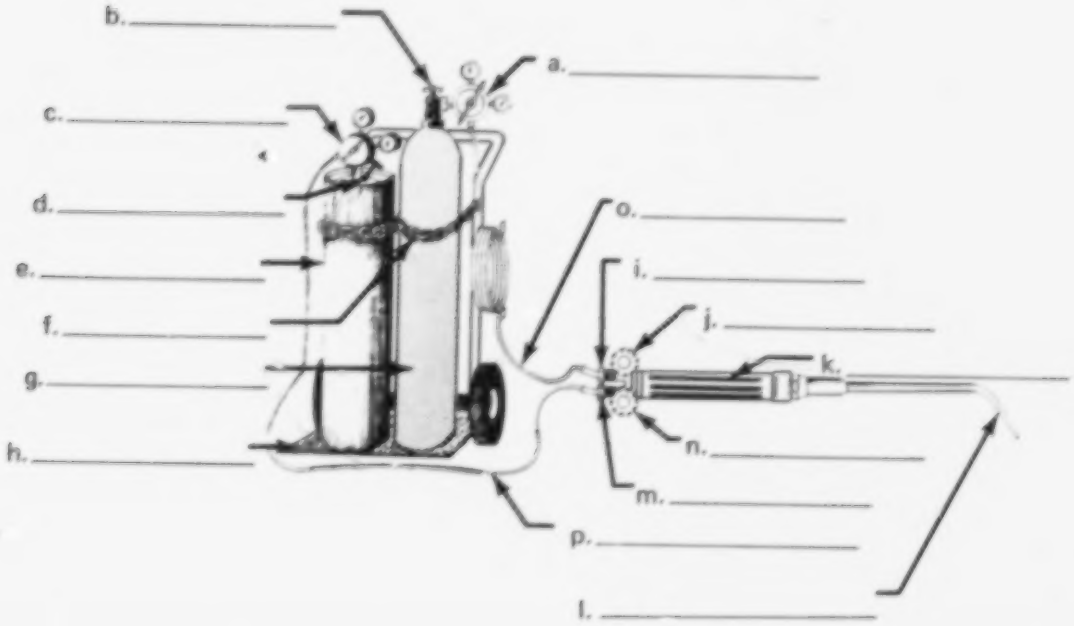
g. Penetration -- _____

_____

h. Tack weld -- _____

_____

2. Identify the parts of the oxyacetylene fusion welding equipment illustrated below by writing the correct names in the blanks.



q. _____

r. _____

s. _____

3. List five factors that determine weld quality.

   a.

   b.

   c.

   d.

   e.

4. List five properties of a good weld.

   a.

   b.

   c.

   d.

   e.

5. List two factors that determine tip size.

   a.

   b.

6. List two factors that determine the type of filler rod to use in oxyacetylene welding.

   a.

   b.

7. State in writing the purpose of a filler rod.

8. Identify the three types of flames illustrated below by writing the correct names in the blanks.

   a._____

b. _____

c. _____

9. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 7. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 7.

State Department of Vocational and Technical Education CIMC Stillwater, Oklahoma LEARNING ACTIVITY PACKETS

for AUTO MECHANICS I

LAP NO._____ CODE:_____

MAJOR INSTRUCTIONAL AREA

ORIENTATION AND SAFETY

INSTRUCTIONAL UNIT

OXYACETYLENE BRAZE WELDING
SECTION A--UNIT VII

LEARNING ACTIVITY PACKET NO.

7

PREREQUISITE LAP(S)

1, 2, 6

PURPOSE: This Learning Activity Packet (LAP) outlines the study activities and performance tasks for "Oxyacetylene Braze Welding." Accomplishing these procedures will aid the student in attaining a working knowledge of this area of training and in achieving a Skilled or Moderately Skilled competency level in the performance of a job associated with this specialty.

INTRODUCTION: The course of study in this LAP will help the student become able to describe the differences between braze and fusion welding, list advantages and disadvantages of braze welding, and describe the reaction when adding bronze to base metals at different welding temperatures.

TASKS INCLUDED IN THIS LAP:

1. Braze weld a square groove butt joint.

AUTO MECHANICS I
OXYACETYLENE BRAZE WELDING

SECTION A--UNIT VII

LEARNING STEPS

Check the Following
Blanks as You Complete
the Required Steps

_____1. Read Unit and Specific Objectives, page 287-A.

_____2. Complete Oxyacetylene Braze Welding Pre-Test, LAP page 3.

_____3. Study The Sections of the Information Sheet, pages 291-A through 293-A, indicated on your Pre-Test. Be sure to study Transparency Masters when required.

_____4. Do LAP Assignment Sheet #1, LAP page 7.

_____5. Do LAP Assignment Sheet #2, LAP page 11.

_____6. Check The blank below if you feel that you can braze weld a square groove butt joint without supervision.

Student Check	Instructor Initials/Date	
	Skilled	Moderately Skilled
_____	_____	_____

_____7. Discuss Your competency in braze welding a square groove butt joint with your instructor. If satisifed with your competency in this task, your instructor will initial Step 6 and you can proceed to Step 13. Otherwise, continue to Step 8.

_____8.	Study	Job Sheet #1--Braze Weld a Square Groove Butt Joint, page 297-A.
_____9.	Watch	Slide/tape presentation "Braze Weld a Square Groove Butt Joint--11GA" (Welding Curriculum, D-III-1).
_____10.	Do	Job Sheet #1--Braze Weld a Square Groove Butt Joint.
_____11.	Stop.	Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6 and proceed to Step 13. Otherwise, repeat Steps 8-10 and then go to Step 12.
_____12.	Stop.	Have your instructor evaluate your work. If you achieve a SKILLED or MODERATELY SKILLED rating, have your instructor initial Step 6 and continue to Step 13. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, have your instructor initial Step 6 and continue to Step 13.
_____13.	Review	Information Sheet (page 291-A) and Assignment Sheets.
_____14.	Take	Oxyacetylene Braze Welding Unit VI Test (see your instructor). If you score 85 percent or more, continue to the next assigned LAP. Otherwise, discuss additional study requirements and possible re-testing with your instructor.

OXYACETYLENE BRAZE WELDING
UNIT VII

PRE-TEST

NAME_____ SCORE_____

DIRECTIONS: This test is to determine how much you already know about oxyacetylene braze welding. Your performance on this test will not be used to determine your grade in the course. Instead, it will guide your instructor in designing this course to meet your needs. Answer only those questions for which you are certain of the answer. Guessing may prevent you from receiving the lessons which are required.

1. Match terms on the right to the correct definitions.

_____a.	Capable of being drawn or stretched out	1. Flux
_____b.	Chemical used to clean metals and to promote fusion during the welding process	2. Braze welding
_____c.	Welding using a brass filler rod to produce a bead between joints	3. Malleability
_____d.	Property of metals which allos them to be bent or permanently distorted without rupture; opposit of brittleness	4. Tinning operation
_____e.	Capable of being bent and returning to original position	5. Ductile
_____f.	Heating the base metal to a dull red color and depositing a bead over the seam (joint) with a bronze filler rod;the base metal is not melted	
_____g.	Chemical stored in core of filler rods to promote melting of metals	
_____h.	Melting a small amount of bronze rod onto the surface and allowing it to spread along the entire seam (joint)	

2. a. List at least six advantages of using braze welding.

1)

2)

3)

4)

5)

6)

b. List at least four disadvantages of using braze welding.

1)

2)

3)

4)

3. Explain why it is important to have a chemically clean surface when performing braze welding.

4. List methods for removing oxides from a clean metal surface.

5. Describe the differences between braze welding and fusion welding.

6. List at least seven reasons for using flux.

   a.

   b.

   c.

   d.

   e.

   f.

   g.

7. Describe the reactions of molten bronze when the temperature of the base metal is:

   a. Too hot--

   b. Too cool--

   c. Correct--

8. Stop. Have your instructor evaluate your Pre-Test and mark the areas below which require additional study.

Refer to the Information Sheet, Sections:

_____I	_____V
_____II	_____VI
_____III	_____VII
_____IV	

You came here from LAP Step 2. If any of the above study areas is checked, continue to LAP Step 3. Otherwise, proceed to LAP Step 6.

SAFETY AND ORIENTATION
UNIT VII

LAP ASSIGNMENT SHEET #1--OXYACETYLENE BRAZE WELDING

NAME_____ SCORE_____

1. Match terms on the right to the correct definitions.

_____a.	Capable of being drawn or stretched out	1. Ductile
_____b.	Chemical used to clean metals and to promote fusion during the welding process	2. Tinning operation
_____c.	Property of metals which allows them to be bent or permanently distorted without rupture; opposite of brittleness	3. Flux 4. Malleability
_____d.	Heating the base metal to a dull red color and depositing a head over the seam (joint) with a bronze filler rod; the base metal is not melted	5. Braze welding
_____e.	Melting a small amount of bronze rod onto the surface and allowing it to spread along the entire seam (joint)	

2. Below is a list of advantages and disadvantages. Place an "X" in the blank beside each advantage and each disadvantage which applies to braze welding.

_____a. Consumes less gas.
_____b. Consumes more gas.

_____c. Is inexpensive to use.
_____d. Is expensive to use.

_____e. Can be used on thin metals.
_____f. Cannot be used on thin metals.

_____g. May be used to join different kinds of metals.
_____h. May not be used to join different kinds of metals.

_____i. Can be used where stress is a factor.
_____j. Cannot be used where stress is a factor.

_____k. Increases speed of joining metals.
_____l. Decreases speed of joining metals.

_____m. Is recommended for parts which are raised to temperatures higher than 500° F (260°C).
_____n. Is not recommended for parts which are raised to temperatures higher than 500° F (260°C).

_____o. Will bond with base metal that does not have corrosion-resistant properties similar to bronze.
_____p. Will not bond unless base metal has corrosion-resistant properties similar to bronze.

_____q. Provides less chance of destroying main characteristics of base metal.
_____r. Provides greater chance of destroying main charateristics of base metal.

_____s. Can be used on malleable castings.
_____t. Cannot be used on malleable castings.

3. Describe the importance of a chemically clean surface in braze welding by completing the following statements.

a. Ensure that the molten bronze will _____ _____ the base metal.

b. Have a _____ bond on the base metal.

c. Allow bronze to _____ smoothly and evenly over the entire _____ _____.

4. List methods of removing oxides from clean metal surfaces by placing an "X" in the blank beside each correct method below.

_____a. Sandpaper

_____b. Grinder

_____c. Solvent, such as kerosene

_____d. Flux

_____e. Wire brush

_____f. Soap and water

5. Identify each of the following as either a characteristic of braze welding or fusion welding. Place a "B" in the blank beside each braze welding characteristic or an "F" beside each fusion welding characteristic.

_____a. Base metal is melted and joined.

_____b. An alloy rod is used to lay a thin coat of bronze along the seam.

_____c. Base metal is not melted.

_____d. Rod with similar characteristics of base metal must be used.

6. List purposes of using flux by completing the statements below with the answers hidden in the following word search. Words appear horizontally, vertically, and diagonally, either forward or backward.

C	A	D	H	E	R	E	T	D	O
O	H	K	J	G	V	A	U	E	X
N	C	E	S	O	O	T	T	O	I
T	P	F	M	L	I	A	J	N	D
A	O	E	F	I	R	N	C	R	A
C	R	I	N	T	C	R	E	B	T
T	E	Q	E	H	E	A	A	D	I
A	S	N	Z	A	B	P	L	W	O
M	E	X	S	V	L	E	D	L	N
P	R	E	L	L	I	F	C	Y	Y

a. Clean the metal _____.

b. Prevent _____ of filler metal.

c. _____ and _____ oxides already present.

d. _____ flow of filler metal.

e. Bring the filler metal into immediate _____ with metals being _____.

f. Increase ability of _____ metal to _____ to base metal.

g. Permit the filler metal to _____ the _____ of the base metal.

7. Describe the reaction of molten bronze at different temperatures by matching each of the following descriptions to the temperature condition.

_____a. The molten bronze will spread evenly and flow over a considerable area.

_____b. The molten bronze will form into drops rather than flowing evenly over the surface.

_____c. The molten bronze will tend to boil and form little balls.

1. Too cool
2. Too hot
3. Correct

8. Stop. Have your instructor evaluate your Assignment Sheet and mark the areas below which require additional study.

   Refer to the Information Sheet, Sections:

   _____I _____V

   _____II _____VI

   _____III _____VII

   _____IV

   If none of the above study areas is checked, proceed to LAP Step 6. Otherwise, study the required sections and continue to LAP Step 5.

SAFETY AND ORIENTATION
UNIT VII

LAP ASSIGNMENT SHEET #2--OXYACETYLENE BRAZE WELDING

NAME_____ SCORE_____

1. Define the following terms.

   a. Braze welding -- _____

   _____

   b. Ductile -- _____

   _____

   c. Flux -- _____

   _____

   d. Malleability -- _____

   _____

   e. Tinning operation -- _____

   _____

2. List advantages and disadvantages of braze welding.

   a. Advantages

      1)

      2)

      3)

      4)

      5)

      6)

   b. Disadvantages

      1)

      2)

3)

4)

3. List three reasons for needing a chemically clean surface in braze welding.

   a.

   b.

   c.

4. Describe methods for removing oxides from clean metal surfaces.

5. Describe the differences between braze welding and fusion welding.

6. Explain the purposes for using flux by explaining how each of the following words or phrases applies to the purposes for using flux.

   a. Cleaning -- _____

   _____

   b. Oxidation -- _____

   _____

   c. Removing oxides -- _____

   _____

d. Flow of filler metal -- _____

_____

e. Adhesion -- _____

_____

f. Contact with metals being joined -- _____

_____

g. Penetration -- _____

_____

7. Describe the reaction of molten bronze at different temperatures.

a. Too hot -- _____

_____

b. Too Cool -- _____

_____

c. Correct -- _____

_____

8. Stop. Have your instructor evaluate your Assignment Sheet. If your instructor is satisfied with your performance, continue to LAP Step 6. If additional study is required, discuss a study program with your instructor. Once you have completed that program to your instructor's satisfaction, continue to LAP Step 6.